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Treatment of Oil Sands With Surface-Active Chemicals to Combat Water Troubles

By C. F. Bonnet*
A.P.I. Midyear Meeting, Tulsa

Oil sands may be treated with surface-active chemicals in order to reduce to a minimum any harmful effects on oil production caused by excess water in the area surrounding a well bore. In planning this treatment, consideration should be given to the physical characteristics of the sand and the effect of pressure differentials upon the flow of the fluids in the sand.

Due to their unique effects on the interfacial relationships between water and sand and water and oil, surface-active chemicals may prove to be valuable tools for correcting abnormally poor production from oil wells.

Composition and structure of surface-active agents greatly influence their effectiveness for various uses. Selection of effective surface-active chemicals requires correct analysis of conditions that prevail in practical use.

Field tests have been conducted under a variety of conditions. Results show that clearcut benefits from the use of surface-active chemicals can be obtained only if the method of field application and the objectives of treatment are selected properly in relation to the importance of surface and mechanical forces in the reservoir.

Recognized limitations and benefits that reasonably can be expected from the use of surface-active chemicals in oil wells are discussed.

The importance of the forces existing between gas, oil, water, and sand in underground petroleum reservoirs has been recognized for some years.

The various factors that influence flow of gas, oil, and water in underground sand bodies have been studied very thoroughly in recent years by many able investigators. The scope of this paper does not allow review of the details of the research already done; but, without the basic information developed by the painstaking work of many research organizations, it would not be possible to discuss the application of chemicals to producing wells and reach any conclusions of importance. References are given in the bibliography at the end of this paper for those who wish the details.

As it is, the following facts about fluid flow in sand reservoirs are known:

1. Oil production from an oil sand is proportional to the porosity and oil saturation of the sand, and to the permeability of the sand.[1, 2a]

2. Oil sands usually contain water,[3, 5] which is considered to surround the sand grains so that the water lies between the oil in the pore spaces and the sand-grain surfaces that form the walls of the pores.

3. When water saturation exceeds 15 per cent, the water interferes[1, 2] with the flow of oil and, if enough water saturation exists, water and oil will be produced together.

4. When water saturation of the sand exceeds 80 per cent, it is[1, 2] probable that the flow will be entirely water, and no significant volume of oil will be produced.

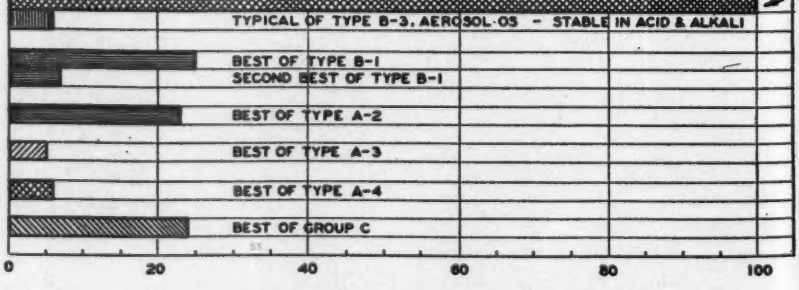
5. The ratio of water production to oil and gas production[1] is not

* American Cyanamid and Chemical Corp., Azusa, Calif.
[a] Figures refer to bibliography on p. 7.

TABLE 1
Classification of Surface-active Chemicals

Group	Type No.	Formula*	Description	Relative Wetting Power of Best of Each Type as Marketed (Per Cent)
A	1	R—COONa	Soaps	..
	2	R—SO_4Na	Fatty alcohol sulfates	23
	3	R—CONHC$_2$H$_4$SO$_4$Na	Sulfated fatty-acid amides	5
	4	R—COOC$_2$H$_4$SO$_4$Na	Sulfated fatty-acid esters	6
B	1	R′$_2$—CHSO$_4$Na	Secondary alcohol sulfates	25
	2	R′—OOC—CH_2 / R′—OOC—O—SO_3Na / H	Sulfated esters of higher alcohols and dibasic acids	Not marketed
	3	R′—Ar—SC_2Na	Alkylaryl sulfonates	6
	4	R′—OOC—CH_2 / R′—OOC—C—SO_3Na / H	Sulfonated esters of alcohols and dibasic acids	100
C	..	.....	Miscellaneous	24

*R=fatty alkyl group; R′ = primary or secondary non-fatty alkyl group; Ar = aryl or aromatic group.



Comparative Rates of Penetrating Cotton Yarn by Solutions of Various Surface-active Chemicals.

FIG. 1

necessarily the same as the ratio of water saturation to oil and gas saturation of a producing sand section, but saturation and production tend to reach an equilibrium.

6. Sands deposited in nature are seldom uniform,[4] and usually consist of alternate layers that vary in porosity, permeability, and water and oil saturation.

During production, some streaks of sand become highly saturated with water, whereas other streaks are not proportionately depleted of oil; so that production characteristics of a well represent the cumulative effect of all layers in the sand bed.

For this reason, much of the remedial work on oil sands consists of attempting by various means to cement off water-bearing strata, leaving the oil-bearing zones unaffected.[6, 7, 8]

The fact long has been recognized that sand generally has a greater affinity for water than for oil.[5] Therefore, when water begins to saturate an oil sand, it interferes with the flow of oil. This can be demonstrated by laboratory tests.

The best method of overcoming water encroachment is pressure control, which has been the subject of much development work. Unless sand bodies of fairly uniform permeabilities and containing oil of similar viscosity and gas content are segregated from sands of different characteristics by the method of completion, the pressure-control program adopted for producing a series of zones simultaneously can be determined only by the mean conditions that will give adequate production and do the least harm to the well as a whole. Cementing is used in selective pressure control because, when it is effective, cementing increases the back pressure on sand streaks that tend to flow water instead of oil.

As far as the recovery of oil from oil sands is concerned, it is probably fortunate that sand surfaces are wetted more readily by water than by oil. Under favorable pressure-drop conditions this probably results in the maximum recovery of oil, and is a part of the force by which edge-water or artificial-water drives displace oil into producing wells.[9]

Under extreme conditions of pressure drop, or when there is a great variation in the permeabilities of interbedded streaks in a sand body, water will displace oil so rapidly in the permeable sections that the drive water finally will channel through to the well. Such an occurrence probably can be overcome only by cementing or by some similar selective method for plugging or back pressuring the channels that have been formed.

Oil recovery usually is facilitated because of the selective wetting of rock by water and by the interfacial tension between oil and water; yet these characteristics sometimes produce unfavorable results because, when water bypasses oil and reaches the well bore first, the water very likely interferes with the flow of the remaining oil. Although such short-circuiting of water can be overcome by cementing in water-saturated sand sections, the cost and occasional uncertainty of present methods leaves room for improvement.

Effect of Surface-active Chemicals

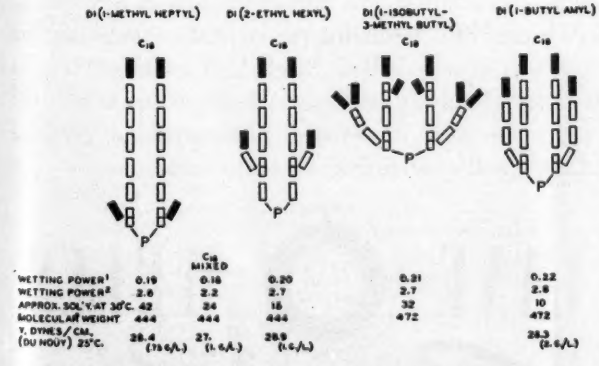
In this connection, much interest has been aroused by the development of chemicals that will cause very large reductions in the surface tension of water, even though extremely small amounts of these chemicals are used.

Certain experiments [10] have shown that, when oil and water are flowed through a sand body, into a well, the ratio of water to oil flowing into the bore continues to increase. Examination of the sand face reveals that more and more of the sand surrounding the well bore is becoming water-saturated, hindering the flow of oil and aiding the flow of water.

On the other hand, if the water in the sand is treated with a good surface-active agent, the reverse will occur. More of the sand surrounding the bore becomes oil saturated, and the flow of water diminishes.

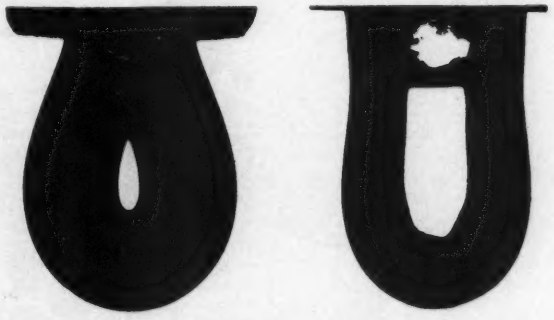
This shows how tests under controlled conditions reveal possible applications for surface-tension depressants in oil production. Perhaps some such treatment can be used some day in connection with pressure water drive, in which there is a small hydrostatic head of water favoring flow of oil from intermediate-size capillaries into a recovery well.

However, except for special cases of artificial water drive, it is difficult to see how we can hope to treat formation water on a large scale; and it becomes



Esters of Sodium Sulfosuccinic Acid, Fourth to Seventh Best Wetting Agents.

FIG. 2



Pendant-Drop Method for Measuring Surface Tension.

FIG. 3

LANE WELLS *Single Shot tells you exactly*

5,280 feet is a wrong answer nine times out of ten if you follow the course of a drill stem. Lane-Wells Standard Photo-Record Magnetic Single-Shot Survey Instrument provides an accurate means of determining the inclination and direction of an oil well as it is drilled. Single-Shot readings taken at regular intervals during drilling enable the driller to keep the hole within the limits of deviation and provide an accurate record of the well's course from surace to bottom.

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apparent that, however interesting the properties of these surface-active chemicals may be, the conditions established by nature in underground oil sands are unlikely to be controlled by such means at an early date.

The investigation described hereinbefore and similar work do have value, because they indicate how surface-active chemicals are likely to affect the oil water sand-grain relationship in the sand which surrounds a well bore, and which can be reached by chemical treatment.

Before proceeding to discuss practical experiences and suggest practical applications for surface-active chemicals in oil-well treatment, a brief discussion of the nature of this class of chemicals is necessary.

Nature of Surface-active Chemicals

The term "surface-active" is derived primarily from the action of these chemicals in water, rather than in any other liquid. Being, in a sense, semi-soluble in water, these chemicals are not distributed uniformly throughout a volume of liquid, but collect at the boundaries wherever the liquid touches a container or any solid matter immersed in the water, or where it is exposed to air (a gas).

The result of adding such a substance to water is that it collects at the boundaries of the water almost in the fashion of a great many tadpoles with their heads (oil-soluble matter) sticking out into the air, and their tails (water-soluble matter) hanging down in the water. Such chemicals are called "surface-active," because they are primarily effective at the water surface. One effect they cause is to reduce surface tension of water, and so they are called also "surface tension depressants."

It is not necessary to discuss surface tension in detail, but it has been the subject of much scientific research. It is enough to say that, when the normal surface of water molecules is replaced by these totally different groups of atoms, the physical relationship between the water and anything it touches is changed entirely.

Water normally is slow to penetrate dry powders, like sulfur, or dry fibers, like yarn or thread. The addition of certain surface-tension depressants makes the penetration almost instantaneous. In the same fashion, water treated with a powerful surface-tension depressant instantaneously penetrates a duck's feathers, displacing the air the feathers normally hold. Also, water so treated rapidly will penetrate porous rock.

To a different extent, the reverse is true. Water contained in a porous substance can be expelled by pressure, and the time to discharge the water to a minimum value often is shortened by the presence of a surface-active agent. The amount of water retained, however, is not likely to be affected much by the presence of a surface-active chemical.

You will notice that the emphasis in these illustrations is on time—on the speed of displacement rather than on volume which, after all, depends on the space available and the amount of fluid available to fill the space.

To go just a little further into the nature of surface-tension depressants, or surface-active chemicals: There are many[11] types of compounds that depress surface tension, but low surface tension apparently results from several different kinds of molecular arrangement, and the results obtained in a physical process, such as oil production, depend more on the nature of the chemical used than on the amount of surface-tension reduction alone.

Perhaps the oldest surface-tension depressant is common soap—e.g., sodium stearate, which consists of a sodium-carboxyl (water-soluble) group and a large insoluble fatty group. There are many similar compounds, or pseudo-soaps, that are used for cleaning, scouring, and emulsifying. These compounds are good emulsifiers for dirt, oil, and other non-wettable substances, and are classed as detergents. Others have very little detergent effect and act more as penetrating agents, allowing water to flow freely into and out of small openings.

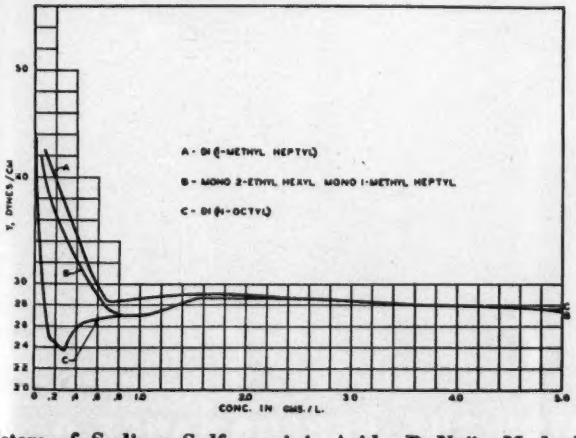
Many surface-active chemicals form precipitates in the presence of calcium and magnesium. The maximum solubility of the calcium and magnesium salts depends largely on the structure of the chemical. Some of these surface active agents are so powerful that surface-tension effects can be accomplished with concentrations too low to form percipitates.

Some compounds, instead of being precipitated by dissolved salts, actually are more effective in strong brine than in fresh water,[13]

Contrast the fact that patents have been issued on the use of some soaps to form precipitates with calicum and plug porous formations that contain brine.

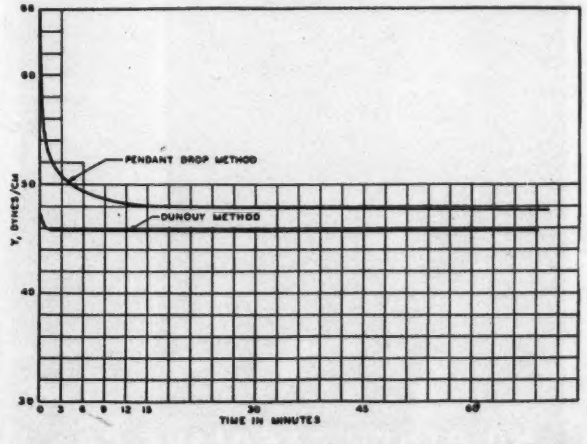
On the other hand, a synthetic surface-active agent is known which will not reduce surface tension except in brine, and which is effective in brines containing up to 20 per cent salt.[14] Many surface-active agents fall between these two extremes.

Surface-active organic chemicals may be classified as shown in Table 1.[11] Fig. 1[11] shows the comparative rates of penetrating cotton yarn with water treated



Esters of Sodium Sulfosuccinic Acid—DuNoüy Method (Temperature, 25 Deg C; Age, 30 Sec).

FIG. 4



Aging of Surfaces of Solutions of Di- (N-Octyl-) Sodium Sulfosuccinate (Concentration, 0.01 Grams Per Liter; Temperature, 25 Deg C).

FIG. 5

TEST PILOTS SAY...

CHIEF TEST PILOT
MARSHAL HEADLE of LOCKHEED AIRCRAFT

"Al, there's the new Richfield Refinery —22 million bucks with a fence around it. Sure costs dough to make good gasoline to say nothing of research and testing. Understand they pioneered the road performance method of testing cars much like we test ships."

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with surface-active chemicals of the various classes.

The comparative merit of surface-active chemicals depends on the conditions of use—i.e., soap is a good detergent, but not a very effective penetrating agent; whereas some reagents considerably enhance the penetrating power of water, without having a very great detergent effect.

It is not unusual to be able to control at will certain properties of synthetic chemicals. If one important property is improved, another less important factor may suffer; but, generally, if we know the conditions to be met, a compound can be selected to accomplish the desired result.

Surface-active compounds primarily effective for aiding penetration are the esters of sulfosuccinic acid and, therefore, are synthetic organic chemicals. The possible combinations that can be prepared in this form of compound are so great that, from 50 different alcohols, more than 1¼ million compounds of this class can be made. A majority of 1,350 different esters have been prepared, and most of them exhibit surface-active properties. Other types of surface-active agents can be made also in homologous series, although most of them do not permit such infinite variations.

Variations in composition or structure result in differences in surface tension, penetration, and other effects. Fig 2 shows the structures of four different chemicals of this type. The configuration is more important than the Number of H-C* groups in determining penetrating efficiency. There is no constant relationship between surface tension and penetrating efficiency.

Fig. 3 shows the difference in size between two drops of water containing different surface-active compounds. This method is used to measure surface tension. Fig. 4 shows reductions in surface tension due to various concentrations of several surface-active compounds. These compounds all have the same molecular weight, but differ in structure, which explains the varying surface tensions at low concentrations.

Fig. 5 compares the pendant-drop methods to the DuNouy method for measuring surface tension, and shows the time required for the compounds tested to reach constant surface tension.

These illustrations show the type of research that is involved in developing one class of surface-active compounds. They show that structure and method of testing have important influences on the selection and effective application of surface-active chemicals.

Assuming that we can select and produce effective chemicals, the next question is: How can they be used to advantage in oil wells?

Laboratory tests have shown that the flow of oil through a water-saturated sand will discharge most of the water, if given pressure and time; but, at the same pressure, the water will be discharged in shorter time, if the sand is treated with a surface-active agent (see Fig. 6). Indications are that the ultimate rate of oil flow in each case is about the same.

Now, let us consider field experiences in trials that already have been made.

Field Applications

Records are available of 10 wells treated with low-surface-tension washes prior to completion. A number of other wells, both old and new, have been treated with surface-active chemicals.

A record of the treatments of several new wells is given in Tables 2 and 2-A.

Example I:

The primary reason for washing the wells indicated in the tables was to remove drilling mud from the gravel pack, and leave the largest possible pore space for oil flow.

All the wells in field "A" were completed in the same sand, but on different structural contours and in different fault blocks, so that no comparison would be made between productivity figures or completion times. Advantages in production were not apparent. Some differences might have been expected in the comparative time of swabbing in the various wells, but the completion times included many variable factors, such as washing time, which in turn depended on the methods used. In all cases, formation pressures were high. Bottom-hole conditions varied according to the structural position of each well; and, although differences existed in production results, these differences could not be attributed only to the type of wash applied.

In field "B" one well yielded good results. On completion with gravel packing washed with water, it produced 20 bbls. of oil per day on the pump. The well was rewashed with a surface-active agent, and then produced 100 bbls. gross—cut-tin 30 per cent, mostly mud. Inasmuch as well No. 2, completed the same way, did not yield equally good results, it appears that a bridge of mud outside the liner

TABLE 2

Field	A	A	A‡
Well	1	2	3
Total Depth (feet)	2,895	3,065	2,950
Wash solution, volume (barrels)	50	335	200
Surface tension of solution (dynes)	27–28	27–28	70–72
Completion equipment: liner (inches)	4¾*	4¾*	4¾†
Washing equipment	Yowell	Drill-pipe swab	Drill-pipe swab

TABLE 2-A

Field	B	B	B
Well	1	1-a	2
Total depth (approximate) (feet)	3,200	3,200	3,200
Wash solution, volume (barrels)	10	10	10
Surface tension of solution (dynes)	72	27	27
Completion equipment	†	†	†
Washing equipment	Dump bailer	Dump bailer	

*Gravel prepack.
†Gravel packed by circulation.
‡Typical well water-washed.

TABLE 3

Field	C	C
Well	1	2
Total depth (feet)	10,969	10,699
Wash-solution volume (barrels)	200	None
Surface tension of solution (dynes per centimeter of water)	27–28	72
Completion equipment:		
Liner (inches)	5⅝	5⅝
Mesh	300	500
Washing equipment	Drill-pipe swab	None
Time before turning into tank (hours)	1	5
Days to clean up	16	7
Final cleanup production	409	1,219
Water	1.0	0.3
Emulsion	0	1.0
Gravity (deg. API)	32.1	30.6
Gas (thousand cubic feet)	249	1,144
Tubing choke	16/64	40/64
Tubing pressure (pounds per square inch)	640	390
Casing choke	16/64	40/64
Casing pressure (pounds per square inch)	1,400	1,315

* H-C = hydrogen, carbon.

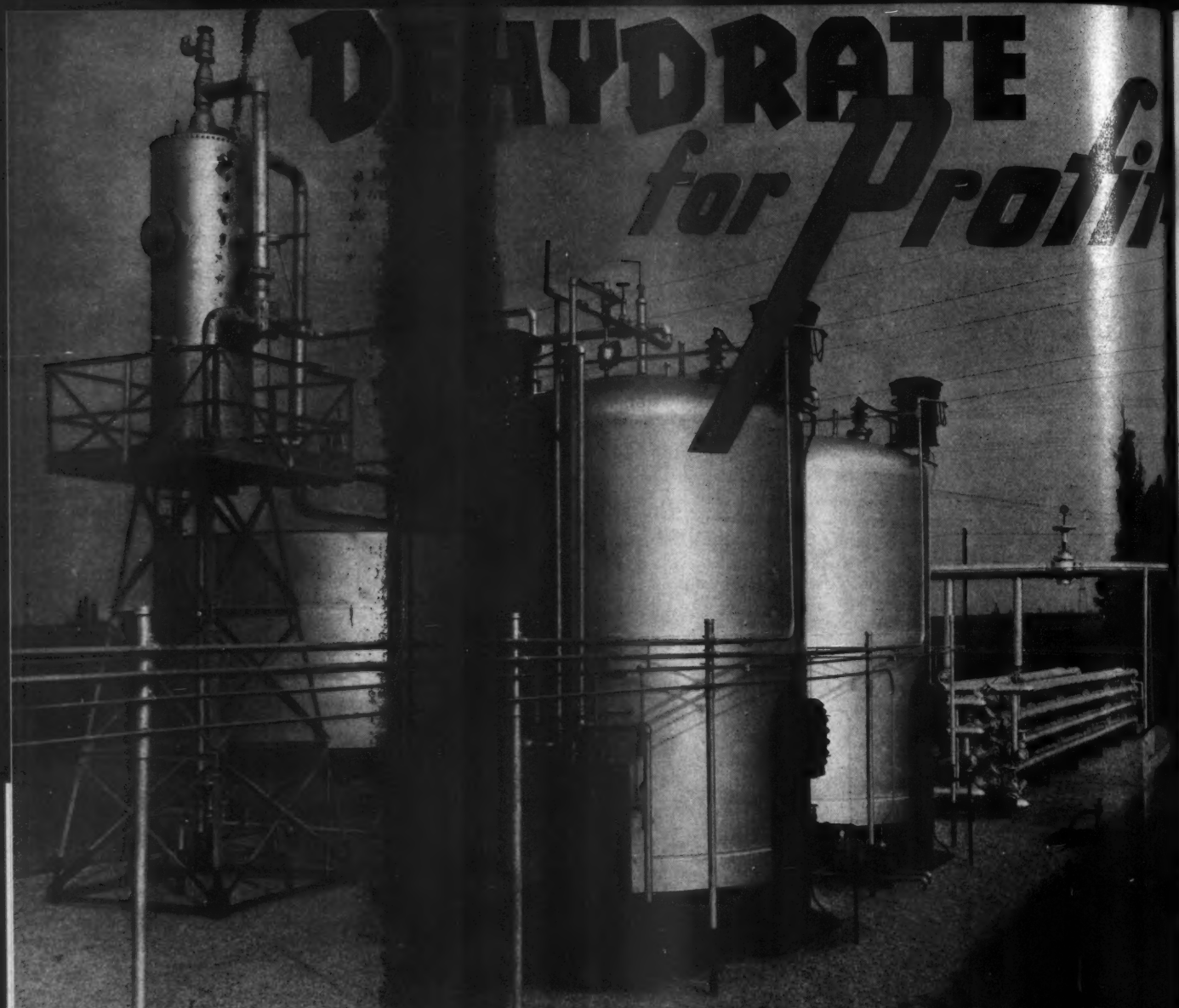

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TABLE 4

Days	Oil (Barrels)	Water (Barrels)	Surface Tension Of Water (Dynes Per Centimeter)
1	5	43	...
2	0	57	30.3
3	16	11	...
4	21	0	...
5	21	0	33.9
6	21	5	...
7	21	0	59.2
8	16	11	...
9	26	11	...
18	Low-pressure trap sample:		
	Unfiltered		43.5
	Filtered		67.6

may have washed out in the first case, but not in the second. Three wells were treated, and in all cases there was some increase in production after the wells had been washed with surface-active chemical solution. In this field there is practically no formation pressure.

Example II:

Another type of new well, treated with low-surface-tension washes, is shown in Table 3.

Fig. 7 shows the comparison of these two wells while they were being cleaned up. Well No. 1 was cleaned up more slowly, but produced more water with equal production of oil. The 200-bbls. wash used on No. 1 was not squeezed into the formation; but even if 200 bbls. is added to the water production from No. 2, the volume is much less than from No. 1.

Example III:

A pumping well treated with a surface-active agent gave the following results:

Tubing hung at 8,016 ft.; fluid level at 6,700 ft.

Equalized 138 cu. ft. of solution at 8,016 ft. (24.6 bbl.).

Surface tension of solution—27.1 dynes per centimeter.

Stood 5 days.

Production data as in Table 4.

A test made by adding to thoroughly conditioned drilling mud enough surface-active agent to reduce the surface tension of the water filtered off to only 59 dynes from a normal 72 recently gave interesting results. The mud so treated was spotted opposite an oil sand, and remained there four days, while the well stood with casing cemented. When the well was completed, it came in more easily than comparable wells, and developed excellent production characteristics for the field. The improved results may be due to the loss of water from the mud, and to surface-active filtrate in contact with the sand for a substantial time before completion.

Conclusions

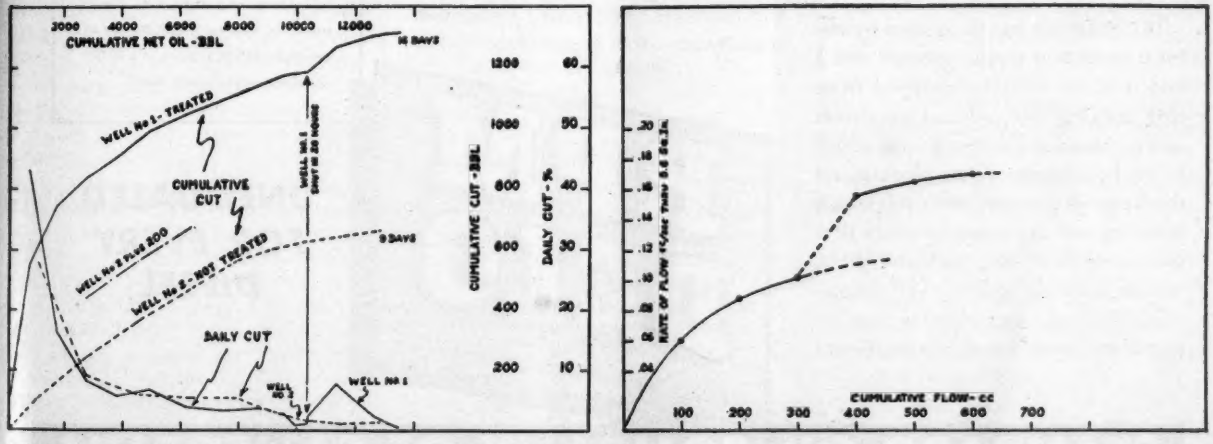
This and other field work may be summarized by saying that the tests have been quite scattered—only a few tests in each field. Results have been difficult to analyze because of varying conditions, lack of complete data, and lack of a sufficient number of tests in any field to allow comparison of average data.

Field experience to date permits the following observations:

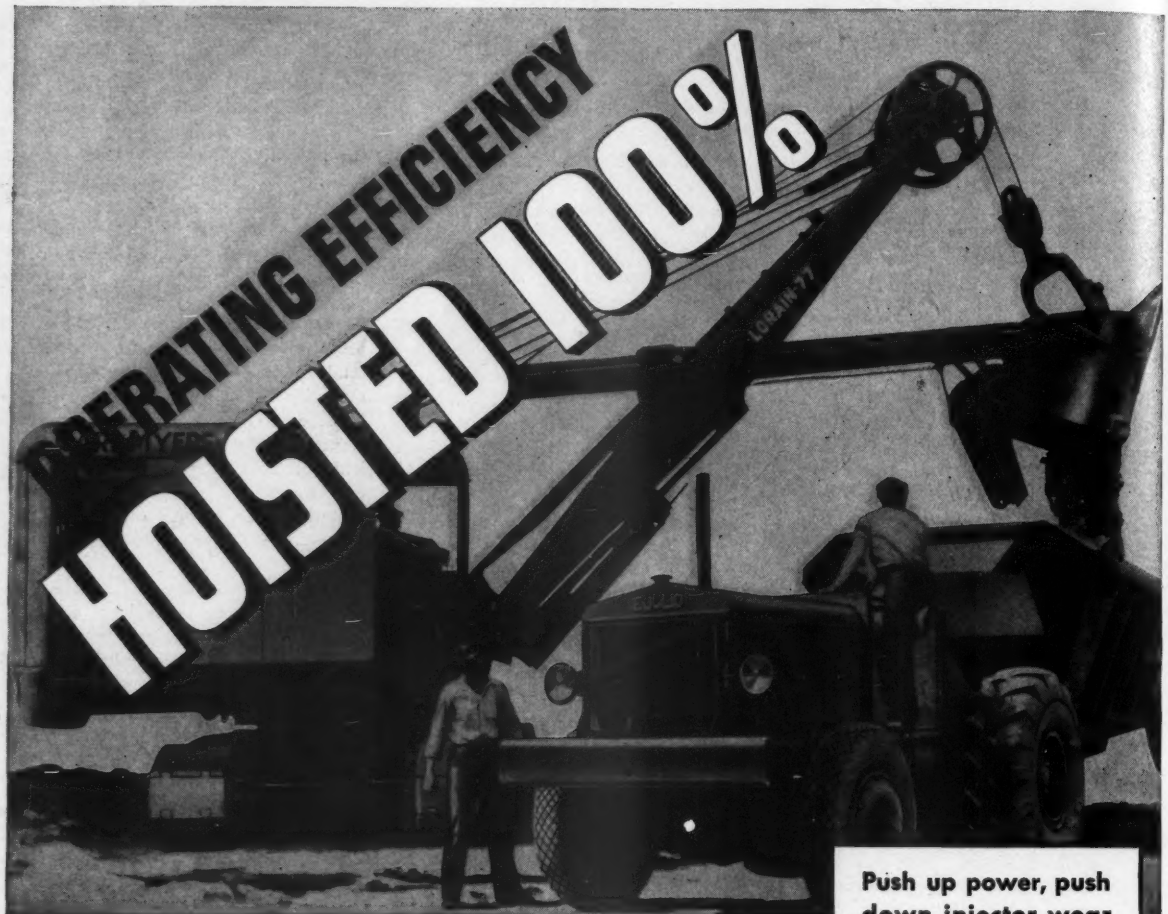
1. The method of applying surface-active chemicals to oil wells is of paramount importance, even in testing. Some tests involved up to 16 hours' rig time merely for mixing large volumes of solution and washing. Frequently, special washing and pumping equipment was involved. In some cases, volumes of solutions exceeded 400 bbls. The cost of chemicals has not been a large part of the cost of treatment, but many treatment tests have cost the operators more than $1,000 each. It is difficult to conduct many such tests unless they are strikingly successful. Less expensive methods of application can be worked out, so that field applications at moderate cost can be made widely and repeatedly.

2. Because of recognized penetrating, emulsifying, and dispersing properties, surface-active agents have been tried for the removal of gelled and caked mud opposite pay formations. Over considerable contact periods, and when mud has been dehydrated thoroughly—both by filtration and by oil—the penetrating effect may be of some value. On the whole, however, these chemicals show little promise of being effective for removing mud. In any case, removal of mud cake must involve intense agitation and, perhaps, considerable volumes of solution. Repeated treatment with different chemical solutions may help. Time of contact and time, as well as degree, of agitation are of equal or greater importance than the chemicals used. Here again, cost is a factor, as time may be the greatest element of treatment cost. Gravel packs are especially difficult to clean, as their physical nature resists agitation and rapid circulation through the gravel.

3. Indications are that, after treatment with a surface-active agent, an equal volume of water will be recovered more quickly than when plain water is used. Often more water is recovered with the initial production after surface-active treatment. Surface-active treatment seems to have little effect on final production, although it may aid in the rapid and more uniform elimination of filtrate water from the sand face of the well bore. Depending on the nature of the sands, this may result in a cleaner well, a well less subject to early short-circuiting of formation water (unless great variations in sand permeability exist); and, temporarily at least, may result in higher ratios of oil to water, when these are produced together. When low or moderate pressures exist, surface-active treat-


CUMULATIVE NET OIL - BBL
WELL No 1 - TREATED
CUMULATIVE CUT
WELL No 2 - NOT TREATED
DAILY CUT
CUMULATIVE CUT - BBL
DAILY CUT - %
CUMULATIVE FLOW - cc

Left, Rate of Displacement of Water from Unconsolidated Sandby Oil, at 1.75 PSI Average Pressure Differential; right, results of well treatment.



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"RPM DELO has been used by me for over 10,000 working hours and I find that the freedom enjoyed from ring sticking has reduced overhauls *and increased operating efficiency 100%.*

"At the moment we are working on the Belmont County, Ohio, job which involves moving three-quarters of a million yards of dirt, rock and shale. We are working against a set completion date and it is necessary that we avoid any costly breakdowns. We are now ahead of schedule and we believe that through the use of RPM DELO we have protected ourselves against any unnecessary shut-downs . . ."

Save *yourself* shut-downs, overhauls, repairs. Besides stopping ring sticking, RPM DELO ends sludge trouble and has *unequaled* ability to *stay put* and lubricate "hot-spots." Other oils actually run away from them!

Push up power, push down injector wear with

STANDARD DIESEL FUEL

Bank on it—this fuel will deliver top power on every piston stroke! And how it saves fuel pumps and injectors! It's made with just the right lubricating quality to protect injector mechanisms with clearances as tiny as 1/400,000th of an inch. What's more it's 100% distilled—absolutely clean.

RPM DELO

REG. TRADE MARK

DIESEL ENGINE LUBRICATING OIL

UNEQUALED FOR EVERY DIESEL

STANDARD OIL COMPANY OF CALIFORNIA

ment may shorten the time for bringing a well onto production, but maximum potential is unlikely to be increased except in comparison to wells that have encountered difficulties in drilling in or in completion and thus have been badly water-blocked.

The elimination of filtered water from the sand face may be of more than superficial importance in these days of curtailed production. The important thing probably is going to be the best average performance for the well over a considerably extended productive life. The equilibrium of forces and volumes in these wells is going to change rather slowly as production proceeds; and, if the sand face around the well bore starts off with fluid saturations about the same as in the reservoir itself, the average performance of the well may be improved, by the original treatment or by treatment from time to time, before the condition of well and reservoir becomes too bad.

4. The problem of "water block" in the sand face probably can be overcome best by: first, good drilling-mud condition to prevent excessive filtration; and, second, treatment of the mud with surface-active agents that will allow water filtering into the sand to be expelled more quickly and uniformly by the flow of oil.

In cleaning out and working over producing wells, surface-active agents may be useful also in the water used to kill the well, or to wash it, so that any water forced into the sand by hydrostatic pressure will be discharged more quickly and uniformly by the reservoir fluid.

In conclusion, it seems worthwhile to say that our natural interest in the surface tension of interstitial and intruded water may not be altogether to the point. The number of dynes reduction in surface tension does not necessarily measure the value of a surface-active agent in an oil well. No exact method of testing is available, but it is likely that small amounts of surface-active agents selected for their effect on the rate of discharging water from porous sands will give better results than when the basis of treatment is simply to lower surface or interfacial tensions.

The field of surface forces, particularly as applied to improving the efficiency of oil recovery, barely has been touched. It will require much persistent cooperative effort to make real progress in this field. Appreciation should be expressed for the progressive interest of the operators who already have used surface-active chemicals in their wells. Early progress should be made if many more will participate in future development work.

Meanwhile, the writer welcomes any discussion of this subject, even though many of the answers may not be available until some future time. The writer also wishes to express his appreciation to those who have provided the information and stimulating discussion that has made it possible to present this progress report on this interesting subject.

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Davies Appointed Deputy Coordinator

R. K. Davies, Standard Oil Co. of California vice president and director, has been appointed deputy petroleum coordinator for the national defense program, according to an announcement by Harold L. Ickes, Secretary of the Interior.

Mr. Davies will take over his duties as the petroleum industry enters a new and strange era of government regulation, defense conservation and pooling of ideas, resources and services.

He will be called upon to provide answers to such problems as the serious East Coast oil shortage, the gradual sapping of the American tanker fleet because of requisitioning by the Navy and transfers to the British government, and the construction of millions of dollars worth of pipelines to convey petroleum products to vital eastern defense centers.

In announcing the new appointment, the Interior Department emphasized the fact that Mr. Davies will not be a $1-a-year man but will receive a government salary —reportedly $10,000 a year. The department stated that he is on leave from Standard of California. As he rose to higher positions within the organization, he specialized in "organization, general administration and interdepartmental and interindustry co-operation relating to production, transportation, refining and marketing of petroleum," the Interior Department disclosed.

Mr. Davies headed the northwest emergency pool for the West Coast during emergency supply conditions growing out of West Coast strikes in 1935; served as chairman of the regional compliance committee to enforce the Federal Trade Commission's code of fair marketing practices and as president of the Fair

R. K. Davies

Practices Association. He is a director of the California State Chamber of Commerce.

The new co-ordinator was "loaned" to the Anglo-American Oil Co., Ltd., of London, in 1928, the Interior Department disclosed, and spent two years in England, Germany and the Continent. He organized and became president of the Standard Oil Co. of British Columbia—Canada's operating subsidiary of Standard of California.

In addition to his positions as vice-president of the California and British Columbia branches of Standard, Mr. Davies at various times has been director of the California Pipeline Co. and the Standard Pipeline Co., president of Standard Stations, Inc., director of the Coast Counties Gas & Electric Co., and vice-president of the Pacific Public Service Co. He was also chairman of the board of American Bitumuls Co. and president of the International Bitumen Emulsions Corp.—asphalt processing and sales companies.

Mr. Davies' home is at Menlo Park, Cal. He is married and has three children.

Although no information was made public on the individuals who will assist Mr. Davies in his new job, it was reliably reported that a second Californian, Lawrence Vander Leck, would be placed in charge of production.

Light, thin tires of synthetic rubber, strengthened by woven glass cord, are being studied for use on high-speed roads.

Nearest thing to a boom that the Los Angeles Basin has seen in many months is activity at the west end of the Dominguez field. Crawford & Associates No. 1, here shown drilling was the third big well to be completed. Crawford-Hiles & Associates No. 1 is pictured rigging up.

Equipment Selection Discussed by Nomads

The problems involved in the selection of equipment for foreign operations were discussed by Dale Nix of the California-Arabian Standard Oil Co. at the meeting of the Los Angeles Chapter of Nomads held at the Jonathan Club in Los Angeles, May 23. The regular monthly meeting of the Nomads was held over to this date in order to place it in Foreign Trade Week and several other speakers of note addressed the members and guests along lines appropriate to export business.

The first speaker of the evening was E. F. Sitterly of the Importers' Guide, New York. He discussed our present relations with South American countries and pointed out the necessity for a spirit of cooperation to be shown not only by the United States but also by the various South American countries with whom we are seeking closer relations. Following Mr. Sitterly's address, Albert W. Hill, publicity director for Foreign Trade Week and representing the Los Angeles Chamber of Commerce, told of the purpose of the Foreign Trade Week and its relation to the oil industry. The third speaker was William T. Foran of Iraq Petroleum Co. who recently returned from the Near East. Mr. Foran's talk was regarding the influence of Iraq and Syria on the war situation and particularly of the part that oil in that area was playing in present developments.

While Mr. Nix's speech was extemporaneous, it clearly disclosed his familiarity with the problems involved in the selection of oil equipment for foreign operations as based on both experience and a careful study of the subject. He first asked the representatives of manufacturers of oil tools if the equipment they were sending to foreign fields was dependable; if it was the kind they would stake their business on. He reminded them that oil equipment purchases start with the geologist and that the man in charge of exploratory work must know something about how he is going to get the equipment into the country, what kind of camp to build for workers and what the casing program is going to be. He must determine to some extent the size and weight of all the equipment which will be required. "If we don't know what you have," Mr. Nix said, "we don't know what to order. We in foreign fields appreciate when you have something new to offer, something that has been tried and proved; and we want you to keep us informed. The man who comes back from a foreign job is in much the same position. He has been out of the country for three years and has read about new developments. We would like you to contact him and show him what has been going on for two or three years while he has been away."

In speaking of dependability, it was stated that there have been disappointing experiences in certain instances where equipment did not perform in accordance with the published data. This required the return of the equipment and forced the operator either to wait for the arrival of new equipment or caused him to borrow pieces to do the job, all of which caused everybody a lot of trouble and gave the supplier a headache. When anything is sent to foreign fields, he advised, be sure that it is dependable. So many times the tools and equipment which are sent out is operated by inhabitants of the country in which the operation is located and these men do not have the experience and ability of American labor. Equipment sent to foreign fields should be as simple as possible with all the safety features that can be built into it. The operator expects the equipment furnished to be reasonably safe.

The supplier of equipment is frequently asked to recommend a list of spares. There are no supply stores near most foreign operations and the companies have to maintain storehouses of their own. Spare parts have to be on hand to run a certain piece of equipment for a certain period of time and the supplier is depended upon to make honest recommendations. If he recommends too much the operator is left with an oversupply; if he recommends too little the operator is often caught short. In general, however, Mr. Nix said that suppliers have given fair and honest recommendations.

"Give some attention to packing," he continued, "for this is very important. We do not always have port facilities or means of readily transporting heavy equipment which very often has to be done by the crudest methods. Most of you do a very excellent job of packing, I know."

A good many pieces of equipment in this country are handled on a rental service basis with the operators and many of the crews make no attempt to learn how to use them. When these crews get out on a foreign job they must be able to operate practically each and every piece of equipment and know how to repair it. The speaker therefore emphasized that complete and detailed instructions are very important.

In closing Mr. Nix summed up the requirements in three words: **Foresight—Dependability—Cooperation.**

"Tex" Harvey Pumps Huasna Wildcat Well

In an effort to make a commercial producer of Gilmore Community No. 1, Huasna area wildcat in sec. 11,32-14, "Tex" Harvey Oil Corp. plugged back and redrilled the hole to 4253 ft. using oil as circulating fluid. On the pump, circulated oil was recovered at a rapid rate at first but after a few days the yield was estimated less than 25 bbls. a day net with a cut of 85%.

Oil Industry Pledges Cooperation To Ickes as Petroleum Administrator

A pledge of complete cooperation was the oil industry's first response to the appointment of Secretary of the Interior Harold Ickes as Petroleum Coordinator, announced by President Roosevelt on May 31. Cooperation of the industry was pledged by W. R. Boyd, Jr., executive vice-president of the American Petroleum Institute, in the following statement issued on June 1: "I had no advance notice of the appointment of a petroleum coordinator for national defense. The American Petroleum Institute, in fact the entire petroleum industry, of course will cooperate to whatever extent is desired or permitted by the coordinator or any other agency of the Federal Government interested in the oil problem. The oil problem is not due to any lack of supplies for all known or predictable requirements for all purposes, but instead is a problem of transportation caused by the diversion of American oil tankers to British Service." To assure "no friction or lack of coordination", Russell B. Brown, general counsel for the Independent Petroleum Association of America, pledged full cooperation as follows: "This is an emergency action and is taken with the apparent intent of insuring all concerned that no friction or lack of coordination in the government, or otherwise, will be permitted to stop the flow of this important and basically essential commodity to its most needed points of consumption. The recent transfer of a portion of our tanker fleet to the British government has caused some severe dislocations in our transportation system. These dislocations can and are being corrected by the industry. With proper coordination between the industry and government no serious suffering need result. New demands on us might be more serious. For this emergency cooperation would seem essential in every agency in the oil industry producing states and the industry will no doubt respond to this situation now confronting us. On this, as on other matters, the President will find the petroleum industry ready." The Conservation Committee of California Oil Producers sent Ickes a telegram of assurance of its "wholehearted desire to cooperate with you as petroleum coordinator for national defense".

There is much speculation as to the extent of the powers conferred on the new Petroleum Administrator by the President's letter of appointment. It is interpreted in some quarters as giving only the authority to advise with governmental agencies and the oil industry and to make recommendations. No drastic change in the present status of the industry is expected, since everything is running smoothly except for the transportation shortage on the East Coast. Despite the appointment of Ickes as Petroleum Administrator, confusion still exists in Washington over the exact division of duties and supervision between Ickes and the Office of Production Management. OPM officials are going ahead on the assumption that they must still deal with petroleum and the oil industry's problems, and Leon Henderson, chief of the Office of Price Control and Civilian Supply, planned additional conferences on crude and refined prices.

In his first formal statement as Defense Petroleum Administrator, Secretary Ickes said on June 4 that the nation may expect less gasoline for automobiles and possibly less fuel oil for home and commercial heating plants. "We face a set of hard facts regarding petroleum that will require all of us to make some kind of adjustments," he said.

Barnsdall Announces Daily Wage Increase

Barnsdall Oil Co. announces, effective May 1, a wage increase of 7c an hour for 186 employees receiving daily wages.

At the annual picnic held June 6 and attended by 575 employees and their families, the company presented service buttons to the following employees:

Gold Button with Diamond: R. A. Broomfield, 38 years service; T. P. Calnan, W. F. Hooley, 20 years service.

Gold button: 15 years service—Miss A. L. Schreiber, W. C. Whaley, Paul Stanley.

H. E. Adelman, J. L. Beard, F. H. Beason, Fred Berger, O. L. Brown, E. D. Carter, G. E. Cato, and A. G. Chancey.

L. M. Combs, M. M. Goodman, B. W. Graft, J. R. Graham, G. A. V. Harris, R. B. Hastings, G. M. Johnson, C. A. Kivell, C. A. Langstaff, E. E. Legate, D. H. Marsh, L. G. Mason, J. G. Murphy, C. F. Regan, A. L. Sims, J. T. Spivey, L. R. Swett, F. L. Torrey, and B. B. Winn.

Silver Button: 10 years service—Miss Marie B. Schlacks, Mrs. Joy Ziegler, R. A. Broomfield, Jr., T. J. Casey, W. S. Cederlof, C. L. Allison, O. J. Anderson, William Bellew, R. L. Billingsley, F. W. Borden, F. H. Bradley, J. R. Brinley, M. E. Britton, and Preston Burrows.

D. L. Caldwell, J. N. Carrico, J. F. Churchill, L. B. Collins, F. R. Cooksey, C. A. Deweber, F. W. Davis, A. B. Ewell, A. A. Faith, D. A. Fortine, Chris Fylling, O. M. Giffin and J. C. Gilbert.

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West Greeley Trial Nears Critical Zone

Superior Oil Co.'s attempt at production 6 miles west of the Greeley field, KCL No. 13, is drilling below 11,110 ft. in search of similar deep sands.

Located in sec. 18, 29-25 the well has not yet reported the Olcese, the first marker of significance in deep Valley drilling, and, which is found in the field near 10,550 ft.

Don Hamilton built a wood derrick to test for production in the old Berry & Todd Thurston No. 1 at the east end of Richfield. Don is said to have been a driller on the well when it was drilled in 1927.

Engineering, Technology, latest news—twice a month in California Oil World.

Development of Plastics, Synthetic Rubbers

Associated With Petroleum Hydrocarbons

(Continued from Second May Issue)

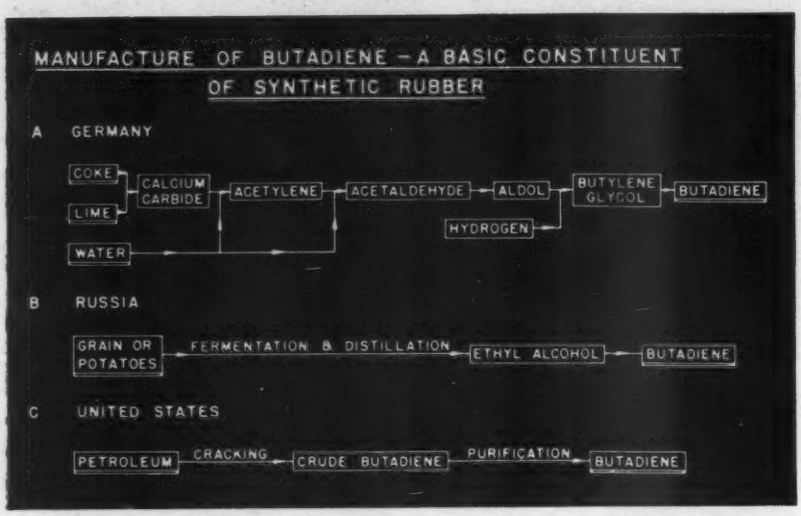


Figure 6

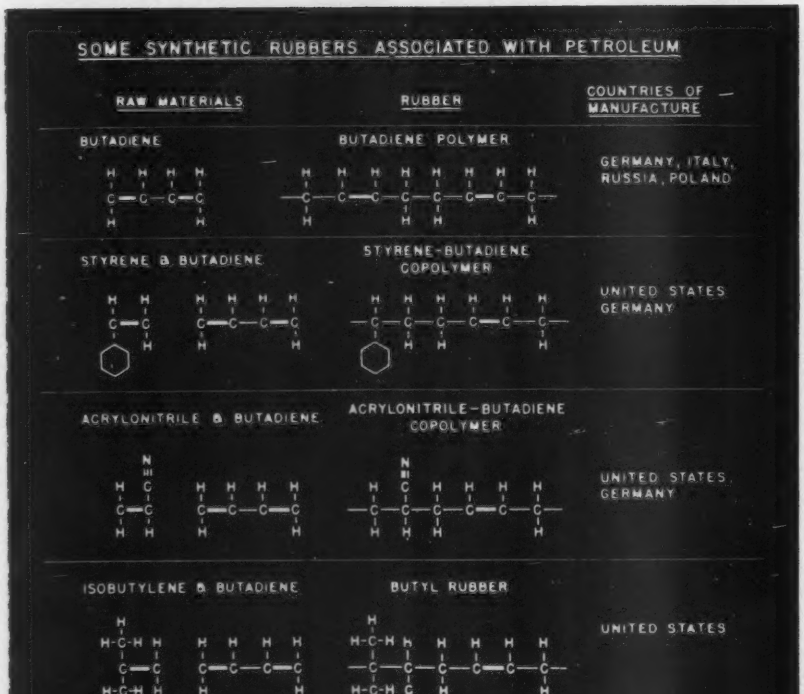


Figure 7

The importance petroleum plays as a raw material in the manufacture of products shown in Figure 4, can be readily seen. Ethylene derived from petroleum, is the product which acts as the king pin around which the processes revolve. For example, in ethyl cellulose, a cellulose is derived from wood or cotton, and subsequently treated with an alkali to form an alkali-cellulose. According to literature, under carefully controlled operating conditions alkali cellulose is treated with ethyl chloride to form the degradation product, ethyl cellulose. [3] Ethyl chloride can be made from petroleum through ethylene. The newly formed thermoplastic material can then be purified by washing, treated with certain plasticizers, fillers, and waxes to give a suitable molding or extrusion composition for the manufacture of plastic articles.

During the time that ethyl cellulose was being investigated in the laboratory, another group known as polymerizable compounds were being studied. Polymerization makes use of the fact that the familiar carbon-to-carbon double bond linkage is not stable under certain conditions. Each monomer molecule is able to link with others to form long, linear, complex chains. The compound made of the long chain molecules is known as the polymer. Methyl methacrylate, polystyrene, and vinylidene chloride are examples illustrative of the polymerization process.

The actual formation of the monomers of these materials is rather closely linked to petroleum. Here, with methyl methacrylate, it is through either the familiar ethylene again or its close relative, propylene, that the other raw materials of methanol, water, and sodium cyanide can be joined and reacted chemically to form methyl methacrylate monomer. [4] The unsaturated monomer formed is a liquid. Under the influence of heat, light or chemical catalysts, polymerization or linking of these individual molecules into a long chain takes place, and the liquid changes to a hard, glass-like solid.

Polystyrene, which was introduced commercially in 1937, is again dependent upon petroleum through ethylene with benzene for the manufacture of its monomer. Here, again, the action of heat, light, or chemical catalysts produces a glass-like solid which, when modified by mechanical and chemical treatment, forms an advantageous molding compound. [5]

Vinylidene chloride, introduced in 1939, can be obtained from brine and petroleum, and again is an example of a polymerization product. Polyvinylidene chloride is a crystalline material and as such can be so worked mechanically to align the fibrous crystals. This orientation offers greatly improved mechanical properties.

These materials are representative of the recently developed plastic products associated with petroleum. They are illustrative of the trend which has been taken by the chemical laboratories in the development of new plastics. They do not stand alone as examples of plastics associated with petroleum, for it may

WIDE RANGE OF PROPERTIES OF PLASTICS AND RUBBER DERIVED FROM PETROLEUM

MATERIAL	SPECIFIC GRAVITY	TENSILE STRENGTH LB/SQ IN	PERCENT ELONGATION	PERCENT POWER FACTOR	WATER ABSORPTION	BURNING RATE	CHEMICAL RESISTANCE	EFFECT OF ORGANIC SOLVENTS	COLOR POSSIBILITIES
VULCANIZED BUTADIENE ACRYLONITRILE RUBBER	.96	UP TO 4000	UP TO 600	5—10		MODERATE	GREATLY IMPROVED OVER RUBBER	AFFECTED	LIMITED TO OPAQUE
POLYSTYRENE	1.05	6000-9000	2—5	.01-.02	0.00	SLOW	VERY GOOD	LIMITED SOLUBILITY	UNLIMITED CRYSTAL TO OPAQUE
ETHYL CELLULOSE	1.14	6000-9000	10—40	.7-2.5	.5—1.5	SLOW	LIMITED	WIDELY SOLUBLE	TRANSPARENT TRANSLUCENT OPAQUE
VINYLIDENE CHLORIDE	1.65	UP TO 60 000	25	3—8	0.00	NONE	EXCELLENT	INSOLUBLE	TRANSPARENT TRANSLUCENT OPAQUE

Figure 8

be safely said that since 1930 fully 50 percent of the newly developed plastic materials are in this group.

The part which available raw materials play in the manufacture of highly useful products is demonstrated in the chemical development of synthetic rubbers which has paralleled that of plastics. The same type of chemistry, primarily that of polymerization, is operative in both cases, the basic difference being that in plastics more rigid materials are usually understood to be meant, while rubber embraces the highly elastic materials.

Chemically, natural rubber is a hydrocarbon of which the basic-building unit is the isoprene molecule. This is represented by the formula $(C_5H_8)x$. It is believed that in rubber there are normally about 2,000 isoprene molecules linked to form the rubber molecule. The earliest noted references to natural rubber date far earlier than those references to early plastic composition. European historians, writing of Columbus' voyages, say that the explorers saw natives of the New World playing games with bouncing balls made from the juice of trees. Sufficient evidence has been found in the excavations of ruins in South America as well as in Egypt, to lead scientists to believe that this unique and now commonplace material was known before the eleventh century A.D. [6]

While rubber was used as early as 1750 in Europe, it was not until 1826 that Michael Faraday definitely determined its chemical composition. Probably the biggest single advance in rubber which makes it the useful material it is today was made when Charles Goodyear discovered vulcanization in 1839. The automotive industry has been responsible to a large measure for the greatly increased production of natural rubber. In 1940 alone, the United States imported over 600,000 tons of rubber; approximately half of the world's production.

Because natural rubber is generally available only from the Far Eastern countries, because it is such a strategic war material, and because it has some shortcomings in the field of chemical resistance and ozone resistance, considerable effort has been put forth toward the development of a suitable substitute. For years chemists have tried to isolate and synthesize isoprene for manufacture into rubber. While it was isolated by Williams in 1860, it has never been commercially synthesized. [7] Germany, woefully short of natural rubber in the World War, was unable to synthesize a rubber from a molecule quite similar to that of Isoprene. The product was known as methyl rubber and was made from dimethyl butadiene. Its similarity can be easily seen in Figure 5.

Unfortunately, products from methyl rubber are low in elasticity and the material was far from a suitable substitute for rubber in automobile tires. In spite of these defects, over 2,000 tons of methyl rubber were produced in Germany during World War I. [8] subsequent developments in the field of synthetic rubber both in the United States and abroad, have lead to chloroprene (2-chlor butadiene) and thiokol (polysulfide rubber). The former material has a molecule quite similar to isoprene, or natural rubber, except that the methyl group is replaced with chlorine. This product can be readily synthesized. Thiokol is a chemical reaction product more comparable with that of a condensation plastic.

The base molecule for a majority of the synthetic rubber is butadiene. Until this product was available, developments in synthetic rubbers were somewhat limited. Butadiene is the base for the more recently known Buna type rubbers. Here, again the availability of raw materials plays an extremely important part in its manufacturing process.

Probably the most work in the field of synthetic rubbers has been done in Germany, Russia, and the United States, with some development work taking place in England, Japan, and Belgium. Since the availability of petroleum in Germany is very limited, particularly in wartime, that country has commerically undertaken the manufacture of butadiene from the readily available raw materials, coke, lime, and water—as in Figure 6.

From coke and lime, calcium carbide is formed. By reaction with water acetylene is formed which is, in turn, synthesized to acetaldehyde, aldol, butylene glycol, and butadiene. Russia, on the other hand, to make commercial butadiene finds it advisable to use a fermentation process. [9] By that process, grain and potatoes are fermented and distilled to ethyl alcohol. Under favorable conditions ethyl alcohol can be reacted to give butadiene.

The United States, with its quantities of petroleum and by-products, has found it advantageous to use the cracking method to obtain crude butadiene from crude oil and natural gas. By subsequent purification a product suitable for polymerization is obtained.

Buna type rubbers derived from butadiene have been generally conceded to have had their origin in Germany. Since the original discovery of these materials, the development has been carried on by a number of countries including the United States. Butadiene alone, like dimethyl butadiene, does not make a satisfactory rubber. It has been found necessary to co-polymerize or interlink butadiene with other monomers which sufficiently modify the finished material to make it satisfactory for specified uses.

Two monomers which have been found suitable for this co-polymerization are those of styrene, previously mentioned, and acrylonitrile. [10] Figure 7 shows the polymerization chemistry involved. Styrene, as a co-polymerizing agent, gives a synthetic rubber which has been used largely in Germany in tires and mechanical rubber goods. It should not be considered a mere substitute for natural rub-

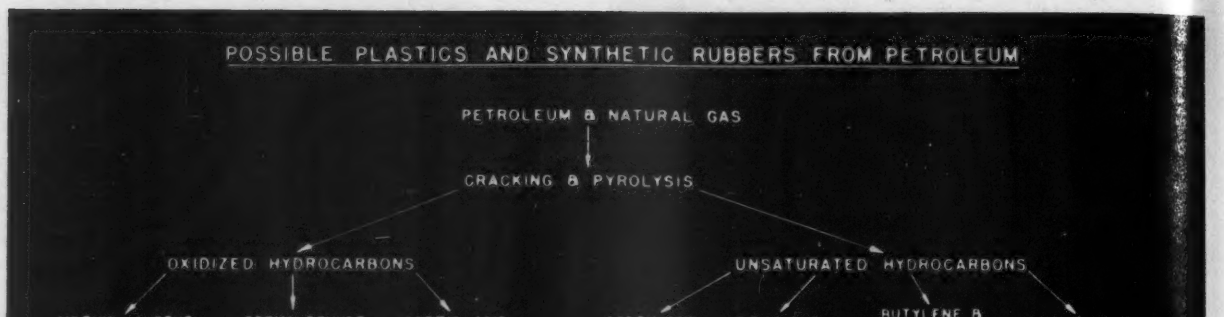


Figure 9

ber, but is somewhat superior to natural rubber in heat and abrasion resistance. Because of its excellent aging properties, heat resistance, low water absorption, and good electrical properties, it is of considerable interest to the electrical industry. It is known as Buna S.

Acrylonitrile, as a co-polymerizing agent, is somewhat more expensive than styrene. Because of its price and limited availability, it has not been used as widely in Germany for the manufacture of automobile tires. Acrylonitrile-butadiene co-polymers are in general more chemical resistant and oil resistant than the styrene types. For this reason they were originally used, both here and abroad, for petroleum and chemical resistant tubing, gaskets, washers, and in other mechanical goods where natural rubber was not satisfactory. More recent studies of synthetic rubber automobile tires show much promise, and at the present time much development work is under way in the United States in this field. Figure 7 also shows the products, isobutylene and butadiene and their use in "butyl rubber" a new type of synthetic rubber being developed here in United States. (11)

All of the true synthetic rubbers are vulcanizable. It will be noted that the finished polymer or co-polymer compares with unvulcanized natural rubber in that all have available double bonds. The vulcanizing process is generally conceded to be one which activates or opens this double bond allowing sulphur or other suitable materials to interlink the long straight chains and thus form a three-dimensional polymer. The degree of vulcanization or the amount of cross linkage, as with rubber, materially affects the ultimate hardness and elasticity of the finished material.

Commercial activities on sythetic rubber are indicated by the world production, which in 1939 was estimated as about 7.5 percent of the total world production of natural rubber (slightly over 1,000,000 long tons). Russia is believed to have produced about 50,000. Germany 20,000, United States 3,000 and the other countries, United Kingdom, Italy, Japan, and Poland, about 2,000. (12) Production of synthetic rubbers in 1940 is without doubt considerably above that of 1939, although actual figures are not yet available.

Synthetic plastics and rubbers from petroleum are not limited to a narrow range of properties. Figure 8 illustrates this point rather well. As indicative of a wide range of properties among these synthetic materials, vulcanized butadiene-acrylonitrile rubber, polystyrene, ethyl cellulose, and vinylidene chloride have been chosen. The properties of tensile strength, elongation, power factor, burning rate, chemical resistance, and color possibilities exemplify the wide ranges which can be obtained. For a rubbery material a tensile strength of 4,000 pounds per square inch is good. By mechanically taking advantage of vinylidene chloride's crystallinity, it is possible to obtain tensile strength of 60,000 pounds per square inch. Elongations from 2 percent up to 600 percent can be obtained from plastic materials derived from petroleum. Electrical power factors (indicative of insulation value) as low as .01 percent are common in the true hydrocarbon, polystyrene. Extremely low water absorption, high strength, excellent chemical resistance, and non-flammability are common properties of vinylidene chloride. As noted, the color possibilities of these products derived from petroleum range from crystal clarity to any degree of opacity With no other single raw material for plastics or synthetic rubber, can such wide versatility be obtained as with the basic constituent, petroleum.

Petroleum and natural gas, as basic raw materials, provide a wealth of possibilities for the manufacture of plastics and rubberlike materials in addition to those practicalities already mentioned. This point can be illustrated by Figure 9 from which it can be seen that from a chemical standpoint practically all of the synthetic plastic and rubbery products known today could be synthesized from petroleum and natural gas. These raw materials play a large part in the manufacture of such widely diversified materials as methyl cellulose, vinyl chloride and vinyl acetate, propylene chloride resins, the polythylene plastics, and the poly-isobutylene synthetic rubbers. With this wide variety of monomers and plastic compositions, it is possible to obtain myriads of combinations of plastics through co-polymers and multi-polymers.

The field of plastic supplementary materials and modifying agents has not been touched upon in this discussion, but it must suffice to say that the number of

(Continued on Page 32)

THIS

LAUGH

OFF!!

We can't imagine where **Earl Noble** picked this one up:

A young father stood over his first born's crib gazing at the sleeping infant. His wife saw in his face a mixture of emotion, rapture, despair, admiration, ecstacy, and doubt. Touched and wondering alike at this unusual paternal attitude and his conflicting emotions, his wife arose, and with glistening eyes, slipped her arm through his and looked fondly into his face.

"A penny for your thoughts," she said in a tremulous voice.

"I don't see how they can do it," he replied.

"Do what?"

"Make a crib like that for $3.39."

And this, somehow, reminds us of **Harry Bell's** story:

Housewife: "You will be careful on my new, polished floor, won't you?"

Plumber: "Don't worry about me, lady, I won't slip. I got hobnails in my boots."

And to complete these frustrations comes **Andy Hazzard** with this touching recital:

A young man and his fiancee had wed and were spending their honeymoon at a large hotel. When bedtime came the bride went to bed and the groom sat by the window and gazed at the moon and stars. The bride called to him and asked:

"Why don't you come to bed?"

He replied: "My mother told me that my wedding night would be the most beautiful night of my life, and I'm not going to miss a minute of it."

On the theme of absentmindedness comes **Walter Crawford:**

Secretary: "Professor, I found your umbrella at the Lost Property Office."

Professor: "That's strange. I've never been there."

Voice on Telephone: "Come over quick, doctor, our little boy has sucked all of the ink out of the fountain pen."

Doctor: "I'll be right over. What are you doing in the meantime?"

Voice: "Using a lead pencil."

Pete the pumper says that maybe, after all, he won't have so much trouble with an army career. He was worried until he saw the following announcement:

"The War Department has prescribed a 'minimum literacy test' which draftees having a less than a fourth-grade education must pass before Army induction.

"Some of the questions are: 'Can you burn water by boiling it?' 'Which swims more in water, a fish or a bird?' 'Can paper be used to write on?' and, 'Which is larger, an inch or a foot?"

There is a warning about jumping at conclusions in **Jim Wotan's** story:

Clerk: "No, madam, we haven't had any for a long time."

Manager (overhearing): "Oh, yes we have it madam. I will send to the warehouse and have some brought in for you."

(Aside to the Clerk) "Never refuse anything. Send out for it."

As the lady went out laughing the manager demanded: "What did she say?"

Clerk: "She said we haven't had any rain lately."

Frank Parker remembered this one:

"William, what are the two genders?"

"Masculine and feminine. The feminine are divided into frigid and torrid; the masculine into temperate and intemperate."

Getting back to business there's **Larry Frankley's** story:

The head of the firm was frowning over a letter. Calling his chief clerk, he said: "That new stenographer, you surely did not hire her on account of her grammar?"

"Grammar!" echoed the clerk. "Gosh, boss, I thought you told me to pick one out for glamour."

Harry Chandler comes to the rescue with this one:

No clergyman being present at a recent luncheon the host singled out a pious, solemn-looking man in black coat and tie, with a religious appearance, and asked him to pronounce a blessing.

The gentleman after being addressed put his hand to his ear and craned forward intently.

"I can tell you're talking to me, sir," he said loudly, "but I'm so dam deaf I can't tell what in hell you're saying."

Names used on this page are entirely fictitious, and any resemblance to persons either living or dead is purely coincidental.

WEIGHT INDICATOR POINTS
Within 1° of vertical is maximum deviation from straight down that many operators allow today. And all it can take to make the bit wander off is too much—or too little—weight, or speed, or pressure, or torque!
With straight hole such an important factor in drilling, doesn't it seem logical that your driller should have accurate instruments with which to keep the hole straight?
Then order a "Sealtite". It's the complete control instrument for all modern drilling operations . . . and it will help you drill straighter wells!
MARTIN-DECKER CORP., LONG BEACH, CALIF.

Martin-Decker Service To Rocky Mountain Area

"Spud" Linder, Martin-Decker Corp. service man, recently left the company's Long Beach plant for an extended trip that is expected to take him to every active drilling rig in the Rocky Mountain oil territory. Mr. Linder is driving a service car equipped with the very latest and most complete portable calibrating and testing equipment for the line of Martin-Decker Weight Indicators and Gauges. His service trip will probably consume several weeks in the Rocky Mountain area.

Gaylord Appointed Chairman Fundamental Research Group

E. G. Gaylord, Standard Oil Co. of California, San Francisco, has been appointed chairman of the 1941 Advisory Committee on Fundamental Research on Occurrence and Recovery of Petroleum of the American Petroleum Institute's Division of Production. C. A. Young, American Petroleum Institute, Dallas, is secretary of the committee.

Members of the committee are: R. C. Alden, Phillips Petroleum Co., Bartlesville, Okla.; R. F. Baker, The Texas Co., New York; F. R. Clark, The Ohio Oil Co., Tulsa; J. B. Clark, Stanolind Oil & Gas Co., Tulsa; B. B. Cox, Socony-Vacuum Oil Co., Inc., New York; M. L. Haider, Standard Oil Development Co., New York; K. C. Heald, Gulf Refining Co., Pittsburgh; and F. H. Lahee, Sun Oil Co., Dallas.

Also C. V. Millikan, Amerada Petroleum Corp., Tulsa; T. V. Moore, Humble Oil & Refining Co., Houston; R. B. Roark, Shell Oil Co., Inc., Tulsa; O. L. Roberts, The Atlantic Refining Co., Philadelphia; **A. C. Rubel, Union Oil Co. of California, Los Angeles;** and the following alternates; **A. G. Loomis, Shell Development Co., Emeryville, Calif.; H. C. Pyle, Union Oil Co. of California, Los Angeles;** and H. D. Wilde, Jr., Humble Oil & Refining Co., Baytown, Tex.

Chairmen of 1941 project advisory committees are: Research Project No. 4, Mr. Cox; Research Project No. 27 and Research Project No. 37, Mr. Gaylord.

Former Shell Man Manages Bakersfield

Claude E. Peavy, popular former San Joaquin Division Superintendent for Shell Oil Co., Inc., was recently appointed City Manager of the City of Bakersfield. A graduate of Stanford University, Mr. Peavy joined the Shell staff in 1925 as production engineer in which capacity he gained experience in nearly every important field in the state. Leaving the Long Beach division in 1934, Mr. Peavy went to Bakersfield as Division Production Superintendent in which position he remained until his resignation last November.

Tom Murphy to Canada For Martin-Decker Corp.

Tom Murphy, Martin-Decker salesman, is now covering the Canadian oil fields for his company. He left Long Beach recently for Canada and expects to be gone several weeks.

Lt. Commander Wilhelm Addresses Oil Forum

Informally and unofficially, Lieutenant Commander V. H. Wilhelm formerly of The Texas Co. and now of the United States Navy, presented a comprehensive and prophetic address at the meeting of Petroleum Forum on May 22. After outlining the statistical position of the petroleum industry from the point of production, storage and reserves, in relation to foreign and domestic markets, Mr. Wilhelm emphasized the need for upward revision of prices for both crude oil and refined products. Those who attended the meeting were astounded to read in the papers the following morning an announcement of substantial increases. Mr. Wilhelm contended that heavy crude prices should be placed on a much higher level as withdrawals from fuel stock storage are now heavy while little increase is needed for light oils as long as inventories of gasoline bearing crudes continue to build up.

The Petroleum Forum is composed of oil executives who meet monthly for informal discussion of problems confronting the industry.

M. E. "Monty" Montrose of Lane Wells Company receives a Certificate of Merit in behalf of the Los Angeles chapter of Nomads for work the California Nomads did in helping to entertain the foreign delegates to the International Petroleum Exposition in Tulsa in 1940. Wm. B. Way, general manager of the Tulsa show, made the presentation at a meeting of the four Nomads chapters in Tulsa during the mid-year meeting of the A. P. I. when Ted Sutter, national president of the Nomads was honored. Similar certificates were given to the New York, Houston, and Tulsa chapters by Exposition officials. E. L. Decker, past national president, also received a certificate for his services as head of the group during the 1940 oil show.

Plans were made at the meeting for building attendance of oil men from other nations for the May 16 to 23, 1942 Tulsa Exposition. The visiting Nomads also visited the Nomads building on the Exposition grounds during their visit to Tulsa to work out suggestions for re-decorating the meeting place for international delegates during the 1940 oil show.

By measuring the infra-red rays which are absorbed and converted into heat, a gas alarm, perfected recently, detects microscopic quantities of complex gaseous compounds.

The 1940 consumption of all petroleum products was equivalent to about 1,800 gallons for every U. S. family.

Total motor vehicle registrations exceeded 30,000,000 for the first time in 1939.

Production « « » » Development

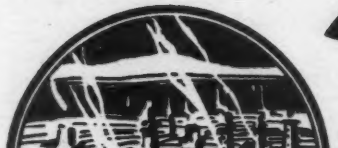
(Figures of Production and Stocks are in barrels of 42 Gals.)

	Total Production April	—DAILY AVERAGE— Apr., 1941	Mar., 1941	Apr., 1940
Group No. 1				
Arvin	20,552	685	710	1,995
Belridge—North	299,012	9,967	9,766	10,926
Belridge—South	60,429	2,014	2,071	2,010
Canal	152,182	5,073	5,077	5,895
Canfield Ranch	1,327	44	44	56
Coalinga	1,045,024	34,834	34,572	25,552
Cole's Levee	182,180	6,072	5,318	3,608
Edison	83,332	2,778	2,761	2,287
Elk Hills	358,380	11,946	11,938	12,420
Fruitvale	161,207	5,374	5,167	5,877
Greeley	183,051	6,102	5,812	3,577
Kern River	321,598	10,720	10,497	11,744
Kettleman North Dome	1,161,451	38,715	38,811	47,086
Lost Hills	101,894	3,397	3,382	4,203
McKittrick	114,724	3,824	3,586	3,569
Midway-Sunset	1,400,356	46,679	47,346	51,683
Mountain View	160,948	5,365	5,389	7,291
Mount Poso	275,690	9,190	8,886	9,758
Paloma	.....	.....	229	186
Rio Bravo	357,006	11,900	11,609	8,542
Round Mountain	225,329	7,511	7,596	7,287
Strand	40,849	1,362	1,329	1,397
Ten Section	405,862	13,529	12,734	8,889
Tupman	231,410	7,713	7,897	1,639
Union Avenue	5,319	177	93	.....
Wasco	52,388	1,746	1,787	1,466
Wheeler Ridge	8,645	288	273	315
Group No. 2				
Capitan	50,524	1,684	1,780	1,865
Elwood	96,466	3,216	3,209	3,727
Rincon	129,161	4,305	4,123	4,059
San Miguelito	113,851	3,795	3,807	3,179
Santa Barbara	7,980	266	197	246
Santa Maria	238,483	7,950	6,169	3,886
Santa Maria Valley	539,339	17,978	18,219	18,359
Summerland	366	12	15	24
Ventura Avenue	1,017,501	33,917	33,830	32,643
Ventura-Newhall	335,082	11,169	11,142	7,206
Watsonville	750	25	25	25
Group No. 3				
Brea-Olinda	172,372	5,746	5,693	5,842
Coyote—East	112,677	3,756	3,645	3,950
Coyote—West	236,467	7,882	8,722	6,217
Dominguez	670,028	22,334	21,664	20,502
El Segundo	45,115	1,504	1,494	2,410
Huntington Beach	856,799	28,560	27,057	27,007
Inglewood	353,186	11,773	11,762	12,440
Lawndale	1,035	34	28	40
Long Beach	1,264,688	42,156	41,807	44,856
Los Angeles-Salt Lake	15,176	506	478	523
Montebello	435,554	14,518	14,904	20,725
Playa Del Rey	109,409	3,647	3,769	4,381
Potrero	70,775	2,360	2,324	1,883
Richfield	208,936	6,965	7,058	9,331
Rosecrans	297,997	9,933	10,455	9,461
Santa Fe Springs	706,803	23,560	23,977	26,013
Seal Beach	198,780	6,626	6,363	7,214
Torrance	262,558	8,752	8,764	11,645
Whittier	6,462	215	214	979
Wilmington	2,457,549	81,918	82,388	83,561
Total	18,422,014	614,067	609,771	613,448
March	18,902,915	609,771		
Increase (*Decrease)	480,901*	4,296		

SUMMARY OF CALIFORNIA OILFIELD OPERATIONS FOR APRIL, 1941
STOCKS HELD IN PACIFIC COAST TERRITORY BY CALIFORNIA OIL COMPANIES

	April 30, 1941	March 31, 1941	April Changes	April 30, 1940
1. Gasoline-Bearing Crude	37,124,169	37,352,395	— 228,226	35,835,610
2. Non-Gasoline-Bearing Crude	11,818,364	11,792,267	+ 26,097	13,520,733
3. Unblended Nat. Gas	2,146,196	2,193,595	— 47,399	2,020,627
4. Gasoline (not including distributing and service stations)	14,829,155	15,551,189	— 722,034	17,645,918
5. Naphtha Distillates	1,906,007[1]	1,751,744[1]	+ 154,263	1,585,311[1]
6. Gas Oil and Diesel Oil	10,279,926	10,052,046	+ 227,880	9,679,406
7. Fuel Oil Residuum	55,517,423	56,874,162	—1,356,739	65,346,750
8. All Other Stocks	8,288,195[2]	8,413,366[2]	— 125,171	8,494,606[2]
	141,909,435	143,980,764	—2,071,329	154,128,961
[1]Estimated amount of unfinished gasoline contained in item 5	1,738,827	1,590,043		1,414,293
[2]Coke included in item 8	467,250	475,862		1,200,358

	New Rigs Up	Producers Active Drilling	Completed	Daily Initial Output	Active Producing	Abandoned Wells Drillers	Producers
Group No. 1							
Arvin	..	....	....	....	14	....	....
Belridge—North	1	2	1	690	77	....	....
Belridge—South	..	....	....	....	204	....	....
Canal	..	....	....	....	34	....	....
Canfield Ranch	..	....	....	....	1	....	....
Coalinga	11	11	9	15,479	944	....	2
Cole's Levee	..	4	2	633	41	....	....
Edison	1	2	1	135	94	....	2
Elk Hills	1	3	....	....	195	....	....
Fruitvale	..	....	....	....	165	....	....
Greeley	3	6	1	1,628	49	....	....
Kern River	1	1	....	....	1,637	....	....
Kettleman North Dome	4	10	1	235	273	....	....
Lost Hills	1	1	....	....	301	....	....
McKittrick	1	1	2	290	205	1	....
Midway-Sunset	2	4	....	....	2,560	....	2
Mountain View	..	....	....	....	166	....	1
Mount Poso	3	2	6	1,028	305	....	....
Paloma	..	....	....	....	....	....	....
Rio Bravo	2	2	3	6,173	85	....	....
Round Mountain	1	1	1	200	226	....	....
Strand	..	....	....	....	11	1	....
Ten Section	2	2	5	9,475	100	....	....
Tupman	2	4	3	3,163	51	....	....
Union Avenue	..	....	....	....	1	....	....
Wasco	..	....	....	....	13	....	....
Wheeler Ridge	..	....	....	....	34	....	....
Group No. 2							
Capitan	2	....	2	2,005	47	....	....
Elwood	..	....	....	....	75	....	....
Rincon	..	1	1	350	69	....	....
San Miguelito	..	2	1	2,587	36	....	....
Santa Barbara	..	....	....	....	21	....	....
Santa Maria	..	....	1	100	201	....	....
Santa Maria Valley	4	3	2	972	150	....	....
Summerland	..	1	....	....	6	....	....
Ventura Avenue	8	9	6	9,177	338	....	....
Ventura-Newhall	6	15	3	785	511	3	....
Watsonville	..	....	....	....	7	....	....
Group No. 3							
Brea-Olinda	1	1	....	....	365	....	....
Coyote—East	..	....	2	115	88	....	....
Coyote—West	1	....	....	....	66	....	....
Dominguez	7	6	3	1,818	218	1	....
El Segundo	..	....	....	....	38	....	....
Huntington Beach	4	4	5	1,089	576	....	2
Inglewood	3	6	....	....	194	....	....
Lawndale	..	....	....	....	3	....	....
Long Beach	3	3	5	745	1,222	....	11
Los Angeles-Salt Lake	..	....	....	....	98	....	1
Montebello	..	....	....	....	353	....	1
Playa Del Rey	..	....	....	....	141	....	1
Potrero	..	....	....	....	21	....	....
Richfield	..	1	....	....	301	....	....
Rosecrans	1	3	3	359	179	....	1
Santa Fe Springs	..	....	....	....	588	....	1
Seal Beach	..	....	1	888	119	....	....
Torrance	1	1	1	90	625	1	3
Whittier	..	....	....	....	38	....	....
Wilmington	12	11	14	5,506	965	....	....
Miscellaneous Drilling	12	32	....	....	....	6	....
Group No. 4—Gas Fields							
Buena Vista Lake	..	....	....	....	1	....	....
Buttonwillow	..	....	....	....	22	....	....
Chowchilla	..	....	....	....	....	....	....
Delano	..	....	....	....	21	....	....
Fairfield Knolls	..	....	....	....	....	....	....
Goleta	..	....	....	....	....	....	....
Marysville Buttes	..	....	....	....	3	....	....
McDonald Island	..	....	....	....	5	....	....
Rio Vista	2	2	....	....	24	....	....
Semi-Tropic	..	....	....	....	....	....	....
Tracy	..	....	....	....	4	....	....
Vernalis	..	1	....	....	1	....	....
April	103	158	85	65,715	15,526	13	28
March	79	140	58	48,754	15,413	10	30
Increase (*Decrease)	24	18	27	16,961	113	3	2*



Field Development

Los Angeles Basin

Honor Farm Well Cores For Showings

Barnsdall Oil Co.'s Honor Rancho No. A-19-1, located on the county prison farm at Castaic, is below 4644 ft. and coring at intervals. No showings have been found worthy of a test.

Lincoln No. 3 Deepens After Testing Wet

R. E. Havenstrite, Operator is deepening Lincoln No. 3 at Del Valle after gun perforations in a blank liner cemented at 7435 ft. tested wet. Now drilling below 7650 ft., the well has become a wildcat seeking a new producing horizon.

Undismayed by results of No. 3, the Havenstrite interests are drilling No. 4 and have preliminary work done for Nos. 5 and 6.

2nd Silver Well Produces Ranger

Enhancing the productive possibilities of the northwest Wilmington area, Silver Petroleum Co. completed its No. 2 well pumping nearly 100 bbls. a day from the Ranger zone. Gravity of the oil was only 14 but there was very little water. The zone is open from 3145 to 3265 ft.

Silver No. 2, with settled production now averaging close to 75 bbls. daily, demonstrates the commercial value of the Ranger sands in this area and shows the practicability of two-zone wells such as are common in the main Wilmington field. Utilizing both horizons, it is possible that several of the wells now on production could double their production with the loss of only two or three points in gravity.

First flowing well in the area was Los Angeles Basin Petroleum Co.'s Phillips No. 1 which came in from the Terminal zone at a rate in excess of 200 bbls. a day of 20 gravity clean oil. A 6⅝ in. combination string including 235 ft. of prepack perforated was landed on bottom at 3755 ft. and cemented through perforations at 3520 ft.

LOS ANGELES BASIN WILDCATS

Area	Well	No.	Section	Depth	Status
Athens	Rankin & Williams	1	7, 3-13	9098	Circulating
	Lytle, Robt. S., Operator, Anderson	1	1, 3-14	4828	Drilling
Castaic	Barnsdall Oil Co., Honor Rho A-19-1		7, 4-16	3849	Drilling
	Collins Oil Co., Explor.	1	8, 4-17	1355	Idle
	Hathaway Co., Ram	1	31, 5-17	2594	Completed
	Jasper, Fred S.	1	17, 4-17	5323	Drilling
	Morse-Mangold, Inc., McDermott	1	26, 5-17	1966	Idle
	Western Gulf Oil Co., Lechler	2	31, 5-17	7178	Running casing
	Young, Roy W., Inc., Walker	1	11, 4-16		Rigging up
Coyote—West	Wilshire Annex Oil Co., Comm.	1	14, 3-11	3527	Drilling
El Segundo	Dominguez Ext. Oil Co., Dominguez-Sunset	1	19, 3-14	7865	Cleaning out
Inglewood	Cliff Baker, Operator, L.A.I.	1	29, 2-14	6555	Drilling
Newhall	Aztec Oil Co., Sanborn	1	6, 3-16	4800	Idle
	St. Anthony Oil Corp., La Salle	1	10, 3-16	420	Drilling
	The Texas Co., Whitnah	1	14, 3-16	4365	Drilling
	Tunnel Oil Co., Needham	1	13, 3-16		Location
Palos Verdes	Newton Development Co., Palos Verdes	1	13, 5-15	1310	Drilling
	Surety Holding Co.	1	22, 5-14		Foundation
Puente Hills	Kosanke, J. F., Dragna	1	24, 2-10	600	Stdg. cem.
	Sunset Oil Co., Baldwin	1	11, 2-11		Foundation
Redondo	Cherokee Oil Co.	1	32, 3-14		Bldg. rig
	Pettijohn, J.E., Dominguez Estates	1	5, 4-14		Foundation
	Wood-Callahan Oil Corp., Dominguez Estates	1	5, 4-14	3730	Completed
Whittier-La Habra	Bristol Oil Co. Cole	1	2, 3-11		Fdn. forms
Wilmington-Torrance	Brayton, Wm. H., Capital	1		5301	Prep. to redrill
	A. S. Johnston Drlg. Co.	41	29, 4-13		Location
	Main Drilling Co., Well	1			Bldg. rig
	Orange County				
Costa Mesa	Thompson, Milton N., Banning	1	9, 6-10	5649	Cleaning out
	San Bernardino County				
Chino	Prado Oil Corp., Lamp	1	32, 2-7	375	Drilling

Oak Canyon Project Testing Deep Sand

Wesern Gulf Oil Co.'s second well on the Lechler lease in Oak Canyon northwest of Castaic is preparing to make a production test of a new sand at 6900 ft. On formation test with bottom at 7107 ft., the well showed a good gas blow and though 43 stands blew dry while being pulled, 15 bbls. of 28.5 gravity oil and 19 bbls. of water were recovered. The hole was then deepened to 7178 ft. finding no more oil sand.

Casing has been cemented at 6889 ft. and preparations are being made for a production trial of sands between that point and 6980 ft. which are the best encountered.

The new horizon is believed to be in the lower Modelo section of the Miocene and is stratigraphically deeper than any tested by the drill in the Castaic region since the recent spurt of activity. Though apparently higher structurally than Lechler No. 1 which obtained small production at 2400 ft., No. 2 found the upper zone barren and was carried on as a deep test. A formation test 6485-6569 ft. recovered 12 bbls. of oil and one of water indicating some possibilities at that point.

Hathaway Co.'s Ram No. 1, located in sec. 31,5-17 just south of the Lechler wells, reduced both its water and oil output by plugging bottom from 2594 to 2560 ft. Production is now said to average 50 bbls. of each per day.

Dominguez Development Continues Brisk Pace

Development continues at a brisk pace in the West Dominguez area where three big wells are on production and two more are being completed. Seven wells are actually drilling and preparations are being made to spud several more.

Those being completed are Crawford-Hiles & Associates No. 1 and Union Oil Co. Austin No. 10. Both should live up to the standard set by Hiles Drilling Co. Grant No. 1, Union Oil Co. Austin No. 9 and Crawford & Associates No. 1, all of which initialled more than 1000 bbls. a day.

Though much interest is shown in outlying leases, it is probable that no great steps will be taken away from the "hot spot" until present outer wells reach the sand. As the zone is relatively thin, conservative engineers estimate the recoverable oil between 100,000 and 125,000 bbls. per acre which is discouraging for extreme edge development. Water shut-offs range at present from 7170 to 7220 ft. while depths run from 7225 to 7235 ft.

West Dominguez Associates No. 1 is preparing to redrill after bottoming in gray sand at 7302 ft. Insufficient oil sand was cored in the straight hole making it necessary to redrill directionally to the south. Edgemont Oil Co. No. 1, most northerly active well and one location north of West Dominguez Associates, is coring for the zone at 7200 ft.

Economy
D+B
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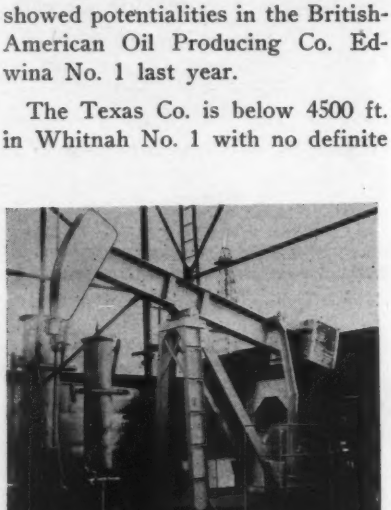
St. Anthony Spuds Lassalle Well No. 1

St. Anthony Oil Corp. is now underway with Lassalle No. 1 after spudding June 3 and setting surface casing at 415 ft. Located in sec. 10,3-16 near Newhall, the project will be a further test of sands which showed potentialities in the British-American Oil Producing Co. Edwina No. 1 last year.

The Texas Co. is below 4500 ft. in Whitnah No. 1 with no definite encouragement below 3200 ft. where 80 ft. of Pliocene sand and shale was subjected to a formation test. Although apparently well saturated and of good permeability, the sands yielded only drilling fluid indicating a low pressure horizon. A second test at 4450 ft. was no better than the first.

Temporarily suspended at 4300 ft. is the present status of Aztec Oil Co.'s Sanborn No. 1 in sec. 6,3-16 between Highway 99 and the Newhall Potrero field. The company plans to install heavier equipment and deepen for a thorough test of the Miocene section. A core taken from present bottom has been identified as Modelo.

Tunnel Oil Co., newly formed by Emmett H. Jones, is preparing to drill a 1500 ft. well near present shallow production in the old Newhall Tunnel area. Location is on Needham property west of the Newhall road.



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Wildcats Scheduled North of Wilmington

Two wildcats are scheduled for early drilling north of the Wilmington field between Main St. and Avalon Blvd. Main Drilling Co., headed by John F. Wilcox, has derrick erected on Main St. north of the Santa Fe underpass while A. S. Johnston Drilling Co. has staked a location at the northwest corner of Lomita Blvd. and Avalon.

Jasper's Wildcat Cores Oil Showings

Fred S. Jasper's wildcat, Videgain No. 1 in sec. 17,4-17 west of the Del Valle field, is reported below 5800 ft. and finding encouraging stringers of oil sand in the cores. Unofficially, the well is said to be running about 250 ft. higher than the producing wells in the Del Valle field.

Young To Spud Saugus Wildcat

Roy W. Young, Inc. is preparing to spud his wildcat well on "Conroy Dome" in sec. 11,4-16 northeast of the city of Saugus. Mr. Young, himself a former major company superintendent, will personally supervise the drilling.

Wilshire Annex Drills West Coyote Wildcat

Wilshire Annex Oil Co. is drilling and coring below 4000 ft. in its Community No. 1, wildcat located in sec. 14,3-11 adjoining the Standard Oil Co. West Coyote Tank Farm. No information has been released on formations encountered.

Dominguez Extension Will Test Old Well

Dominguez Extension Oil Co. is cleaning out the long abandoned Julian Petroleum Co. Pacific Land & Title No. 1, located south of the Standard Oil Co. El Segundo Tank Farm, with the idea in mind of recoring showings logged at 4500 ft. Should these showings be unworthy of a test, there is a possibility of deepening to the schist basement which was not encountered when the hole was deepened to 7865 ft. by Sunset Oil Co. four years ago.

Cable Tool Well Drilling at 1350 ft.

Newton Development Co.'s cable tool exploratory job at the southwest tip of Palos Verdes is below the 1350 ft. mark and still going strong. Equipment used on this well is probably the best ever used in the Los Angeles Basin for this type of drilling.

Redondo Project Finished on Pump

Wood-Callahan Oil Corp. obtained 75 bbls. a day in completing Dominguez Estate No. 1 at Redondo. The hole was bottomed at 3730 ft. and finished with 410 ft. of oil zone open. A prepack type liner was used.

J. E. Pettijohn and Cherokee Oil Co. are expected to resume work on their nearby projects.

Second Well Enters Inglewood Deep Sand

Jefferson Oil Co. proved to a world which was beginning to wonder, that there is really a deep zone at the north end of Inglewood. It did it the hard way; by blowing gas and mud all over the landscape for a few hours until enough heavy mud could be mixed to kill it.

After the completion of Federal Oil Co's discovery well every petroleum engineer in the field looked into his crystal ball and read a complete set of answers to lithology, structure, etc. and eight more wells were started with the utmost confidence. By the time the first couple got below 5500 ft. a few shadows of doubt were crossing the engineers' agile brains and from that time until a few days ago more than one of the professional fraternity was graying at the temples. Each had painstakingly worked out his own original picture, but Mother Nature crossed 'em all up and insisted on her own private version. Just what that version is, nobody knows yet. All that is known for sure is that Jefferson Oil Co. topped the Federal sand at 7740 ft. which is structurally about 150 ft. higher than the first well, 400 ft. away, after entering the Miocene at 1000 ft. higher.

Neither of these wells found any oil sand above the main zone, but that did not prevent Hogan Petroleum Co.'s Machado No. 1A finding a likely looking zone at 7100 ft. The well is now bottomed at 7224 ft. with casing cemented at 7100. Approximately 25% of the interval is silty oil sand.

The Texas Co. surprised everyone by coring "Nodular" shale in I. H. Smith No. 7 after everyone was beginning to believe the term about as appropriate as "Wagon Wheel" at North Belridge where there isn't any "Wagon Wheel". Texas found the McCoy Nodular at 7720 ft. which is 425 ft. below the base of the nodule-less Nodular shale. After re-checking their electric logs, the other operators whose wells are sufficiently deep are now convinced that they too have several nodulars. They just won't let the Texas crowd get ahead of them. Not giving an inch, the Texas boys come back that the others may have their nodular shales but the I. H. Smith No. 7 is the only well, so far, to find genuine nodules. And they are right.

At any rate, no two wells are checking alike and as it's still impossible to see underground, the engineering gentry are now inclined to sit back and see what happens. Some will venture a guess that the deep zone will be found quite regular and that the upper disturbances do not carry to depth. We shall see.

Status of the active wells was as follows at press time:

R. R. Bush Oil Co. Merchants No. 1, trying to straighten hole with bottom at 7000 ft. Bush Oil Co. Smith No. 1, drilling at 7800 ft.; top Miocene about 7450 ft.

Federal Oil Co. Smith No. 2, drilling at 7413 ft. This operator does not release detailed information.

Hogan Petroleum Co. Machado No. 1A, depth 7224 ft., 7 in. casing standing cemented at 7100 ft. Top Miocene 5490 ft. Cored shale streaked with silty oil sand from 7100 to 7224 ft. Several nodular type shales but no true "Nodular".

Oscar Howard No. 1 (Jergins) is drilling at 6800 ft. Top of Miocene 6520 ft.

Jefferson Oil Co. Smith No. 1, preparing to drill ahead from 7779 ft. after killing blow-out. Casing cemented at 7372 ft., top deep zone 7742 ft.

Royalty Service Corp. Marlowe-Burns No. 1 is drilling at 5000 ft.

The Texas Co. I. H. Smith No. 7 topped Miocene at 5680 ft., first Nodular at 7237 ft. and true Nodular at 7720 ft. Bottomed at 7773 ft. in shale showing 19° dips and preparing to run casing.

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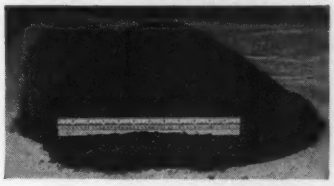
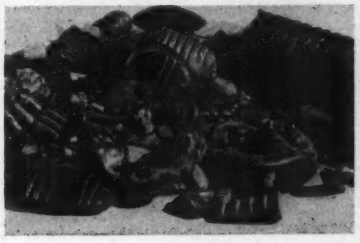
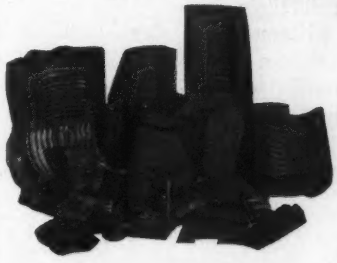


For Millings?



Bridge Plugs?



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San Joaquin Valley

Seaboard Oil Plans West Cantua Well

With Shell Oil Co.'s success in Fresno county wildcatting still important news in North Valley operations Seaboard Oil Co. announces plans to drill Hagood No. 1 near the west quarter corner of sec. 6,17-1 in Fresno county, near the San Benito county line.

Located west of the Cantua Creek area, which in the past has shown evidence of oil possibilities in each of 16 wells drilled in the district, the proposed wildcat will be put down in a little tested portion of the west Valley. There are, however, predecessors within a few miles distance in all directions. The general area has before been drilled by Seaboard, Standard, Union, Ohio, Superior and many smaller companies.

Fifteen miles due south of the Seaboard try, Gatos Creek Oil Co. intermittently works a cable tool job in sec. 19,19-13. Situated due west of Coalinga production, in the Gatos Creek area, the well was last reported idle at 810 ft.

Conoco Redrilling Shafter Jinx Well

Continental Oil Co. is redrilling KCL No. C-2 at shallow depth after setting a whipstock at 1008 ft.

Dogged by persistent misfortune in the guise of stuck drill pipe and redrills, the hole, in sec. 35,27-24, once reached 11,349 ft., not far from the objective Vedder sands.

Latest of a series of deep holes in the area, the present try hopes for a productive closure in the area where the sands are known to exist.

Shell Oil Co. Finds Fresno County Field

Discovery of a new Fresno county field was credited to the Shell Oil Co., Inc. when its Raisin City wildcat, Properties Inc. No. 8-18, was finished flowing 14,500,000 cu. ft. of gas and 24 bbl. of 36 gravity oil from plugged depth of 5045 ft.

Located in sec. 18, 15-18, some 6 miles south of the town of Kerman, the well apparently has been commercially proved and thus becomes the only San Joaquin Valley discovery since Paloma was uncovered in August, 1939.

Bottomed in barren Eocene sand at 6429 ft., the well was plugged back to its present depth after formation tests from 5176 to 5234 ft. and 6176 to 6320 ft. recovered only mud and salt water. The substantial flow was brought in after 8⅝ in. casing was cemented at 5005 ft. and a 5½ in. liner, perforated from 5005 to 5045 ft., was landed on bottom. First yield was through a 40/64 in. bean under 1570 lbs. tubing pressure and 2005 lbs. casing pressure.

Beaned back with a 16/64 in. orifice, the well flowed a 3,480,000 cu. ft. rate under 1950 lbs. tubing and 2005 lbs. casing pressure, and was later shut in with pressures equalizing at 2000 lbs.

Yet behind the pipe are Temblor sands which yielded a fair amount of 22 gravity oil on formation test during the early stages of drilling. Results of a trial from 4697 to 4754 ft. indicated that the sands might be capable of production.

Shell Oil Co. is already planning its next well, Santa Ana & Fresno

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SAN JOAQUIN VALLEY WILDCATS

Area	Well	No.	Section	Depth	Status
	Fresno County				
Cantua Creek	Seaboard Oil Corp., Hagood	1	6, 17-13		Grading roads
Friant	Gay, D. M.	1	3, 11-21		Rigged up
Gatos Creek	Gatos Creek Oil Co.	1	19, 19-13	810	Idle
Raisin City	Gen. Pet. Corp., Burrel	1	2, 17-18		Location
	Shell Oil Co., Properties, Inc.	8-18	18, 15-18	6429	Completed
	Shell Oil Co., S.A. & F.L. Land	1-19	19, 15-18		Location
	Kern County				
Belridge—South	Section 27 Oil Co., Aslin	1	27, 28-22	130	Drilling
	Sentinel Oil Co.	1	10, 28-20	2515	Drilling
Buttonwillow	The Texas Co., S.P.	47-15	15, 28-24	11322	Drilling
Devils Den	Herzog, R. D., Collins	1	26, 25-18	359	Rng. csg.
	Herzog, R. D., Marine	29	26, 25-18	149	Idle
	Herzog, R. D., Marine	30	26, 25-18	202	Drilling
	Herzog, R. D., McKay	1	26, 25-18	451	Rig pump
Edison	Crude Oils, Inc., S. P.	7	31, 29-30	460	Idle
	Kern Valley Drlg. Co., Williams	1	30, 30-30	1100	Deepening
Famosa	C.C.M.O. Co., Famosa	12-1	12, 27-26	4909	Drilling
Grapevine	Continental Oil Co., Tejon	A-1	28, 11-19	6105	Abandoned
	Kern Line Oil Co.	1	19, 11-19	8390	Plugged 6920
	Richfield Oil Corp., Tejon	2	19, 11-18		Rig
Greeley—West	Superior Oil Co., KCL	13	18, 29-25	10110	Drilling
Lost Hills	Tide Water Assoc. Oil Co., Isolis	46	16, 27-21	2422	Drilling
Maricopa	Bankline Oil Co., Well	57-23	23, 11-23	1123	Drilling
McClung	Ohio Oil Co., KCL	G-1	36, 29-26	7611	Drilling
	Union Oil Co., KCL	31-3	3, 30-26	11512	Drilling
Mt. Poso	Carey, J. F., U. S.	1	34, 26-28	1355	Idle
Paloma	Union Oil Co., Morgan	81	14, 32-26		Location
Richgrove	Borget, A. J., Kendall	1	16, 25-27	1700	Idle
Shafter	Continental Oil Co., KCL	C-2	35, 27-24	11349	Redrilling
	Kings County				
Kettleman So. Dome	Bristol Oil Co., Smith	1	35, 24-19	8054	Plug.—1729—pumping
Pyramid Hills	Pyramid Prod. Co., Spreckles	2	16, 24-18	120	Drilling
	Tide Water Assoc. Oil Co., West Slope	76	20, 24-18	4329	Abandoned
Reef Ridge	Blair Oil Co., Blair	1	24, 23-16	985	Cleaning out
	Easterbrooks, S. F.	1	11, 23-26	715	Drilling
	Tulare County				
Terra Bella	Stout, C. W., Stout	1	35, 22-27	1135	Abandoned

Land No. 1-19, in the northwest corner of sec. 19,15-18 about 660 ft. south of the strike.

First of the other large leaseholders in the vicinity of the play to start is General Petroleum Corp., which is planning to dig Burrel No. 1 in the northeast quarter of sec. 2,17-18. about 9 miles southeast of the Shell discovery.

Continental Quits Grapevine Area Try

Continental Oil Co.'s Tejon No. A-1, in sec. 28,11-19 just north of the small spot of Grapevine production, is abandoned in shale and gray sand at 6105 ft.

Drilled in the hope of finding a separate accumulation indicated by both surface geology and geophysics, the well cored only gray sand with poor oil showings at intervals below 5600 ft.

A formation test to bottom with the packer set at 5937 ft. recovered only gassy mud with traces of oil, salt water, and a fair gas blow.

Apparently feeling that the trial was conclusive, the company is reported planning to quitclaim its acreage.

Near the center of sec. 19,11-19, Kern Line Oil Co. is idle after plugging its 8390 ft. hole to 6920 ft.

A series of perforating and bailing jobs uphole from an initial plug at 8100 ft. resulted in small rises of water and mud, some faint oil and gas showings and in some cases no fluid entry at all.

East of the Grapevine plains, near the foothills of the Tehachapi mountains, Richfield Oil Corp. is preparing to drill Tejon No. 2.

Located near the east quarter corner of sec. 19,11-18 at the west boundary of the Tejon Ranch, the well will again try the productive possibilities of the company's large south Valley holdings consisting of several thousand acres and upon which considerable geophysical investigation has been made. Lease requirements are understood to require considerable prospecting to depth.

Union Oil Schedules Paloma Extension Try

Already proved to be a geographically large field, Paloma will be tried for further extension by Union Oil Co.'s Morgan No. 81 in the northeast corner of sec. 14,32-26, a mile south and one location west of Western Gulf Oil Co.'s recent extension KCL No. B-12-12.

Drilled in the far southeast flank, No. 12-12 was expected to find black oil sand rather than the gas cap distillate produced high on structure. Instead the well proved to be back on the axis of the field on a relatively high structural point and recovered the same high gravity distillate and wet gas already found in the field.

It is the opinion of many engineers that black oil sand may yet be found at the flanks of the field, how-

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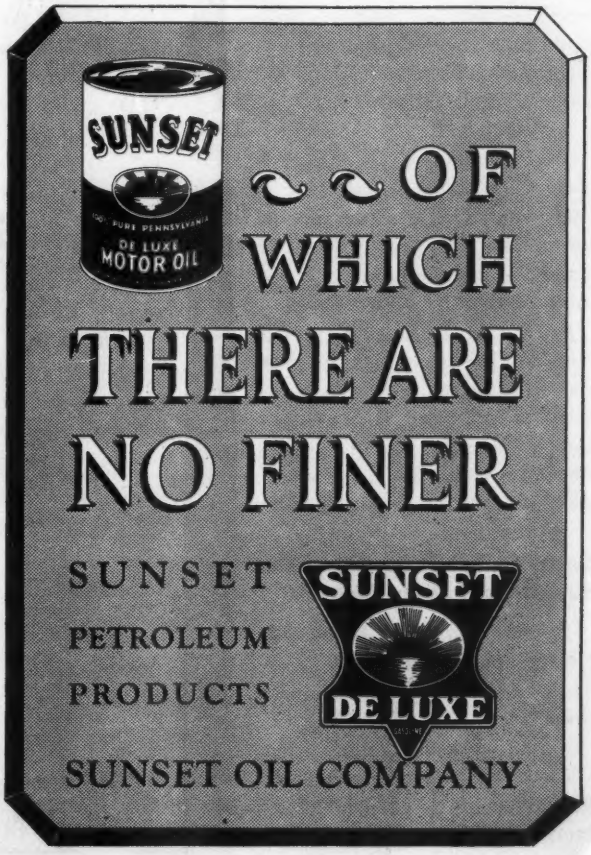

ever since it is so large, the conservative drilling program has not yet reached very far down dip.

A repressuring program intended to conserve the vast gas resources of the field, which will also permit immediate recovery of the high test condensate is proceeding and should soon be ready for final approval by the companies participating.

Belridge Oil Explores North Field Deep Zone

The North Belridge field of Kern county is being explored to depth by Belridge Oil Co.'s No. 55-26. Situated in the southwest corner of sec. 26,27-20, in the center of the field, the well was last reported below 8300 ft.

Located about 30 miles northwest of Taft the field is an anticlinal accumulation in the low rolling hill country of the central Valley. Discovered in 1915, the field first produced from three shallow sands down to the Santa Margarita in the uppermost Miocene. In 1930 the Temblor, or Middle Miocene sands were proved productive at an average 300 bbl. capacity. In 1932 the Bloemer and Belridge sands of the Vaqueros, or Lower Miocene, was proved productive to the tune of more than a 400 bbl. average of 32 plus gravity oil. Since the deeper zones also provide an ample commercial supply of gas, gravities in some cases run to 55 A.P.I.

With the present deep production coming from nearly 9000 ft. and with so many horizons proved to be saturated, it is not unreasonable to assume that sands of the Eocene or even the Cretaceous ages may also prove productive.

Kern Valley Drlg. Co. Resumes Edison Outpost

In sec. 30,30-30, southeast of the Edison field and at the easterly flank of Valley wildcatting operations, Kern Valley Drilling Co. has resumed work on Williams No. 1.

Last reported deepening at 1100 ft. the well was suspended in gray sand at 700 ft. in April of this year. While nothing of significance was logged, gas showings were reported at 680 ft.

McClung Area Try Yet Above Vedder

Union Oil Co.'s KCL No. 31-3, sec. 3, 30-26, is coring in shale at 11,674 ft. without yet having found the Vedder zone.

Situated a little more than two miles southeast of the Greeley field the current deep test is expected momentarily to find the objective since Superior Oil Co. topped the zone at 11,126 ft. in KCL No. 12, two-thirds of a mile to the east in the same section.

The zone has been found along this southeast trend in many previous deep trys but in each case has failed to produce. The continuation of activity along the same general play indicates that many believe a closure exists in the sands somewhere along the structure.

Two miles to the northeast, near the center of sec. 36,29-26, Ohio Oil Co.'s KCL No. G-1 was last reported at 7611 ft. in shale and gray sand. Nothing has been reported in this well since a formation test of a 14-ft. sand body from 5177 to 5193 ft. recovered only salt water with a trace of gas.

East Valley Fields Get Continued Boom

Kern Front, Kern River, Mount Poso and Round Mountain are seeing more activity than has been present in some time. The demand for the oils produced in these fields has brought on a development program long anticipated.

In the Kern Front field, General Petroleum Corp. plans immediate work on 4 wells on the Young lease in section 14,28-27.

Kern River is represented by one well each of the East Puente Oil Co., Kern Hills Oil Co., National Oil Co., Riokern Oil Co., S & W Oil Co. and the Stephens Oil Co.

At Mount Poso General Petroleum and Shell Oil Co. each continuing a substantial program and Ring Oil Co. is preparing to drill Vedder No. 1 in sec. 28,26-28.

Crestmont Oil Co. is finishing Olcese No. 1-1 at Round Mountain and is planning a second well at once. V. W. David is starting well No. 6 in sec. 17,28-29 while Trico Oil & Gas Co. is finishing Coffee No. 8 in sec. 8,28-29.

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Coastal District

Union Oil Completes Big Santa Maria Well

Flowing through 5½ in. casing at the initial rate of 1052 bbls. in 14 hours, Union Oil Co. brought in Russell No. 4 as one of the largest wells completed in the Santa Maria Valley field in many months. The hole was bottomed in Franciscan at 4611 ft. where a combination water-oil string was landed and cemented through perforations at 4213 ft. The oil was clean and tested 16.4 gravity.

Less successful was Union's Acquistapace No. 2 in sec. 22,10-34 which made only 42 bbls. cutting 8.0% on the pump.

Geo. F. Getty, Inc. obtained 781 bbls. daily in Vicente No. 6 in sec. 27 which was completed with 380 ft. open to bottom at 4816 ft. Equipment has been moved to Carranza No. 1 which is now below 3000 ft.

Signal Oil & Gas Co. finished Yelkin No. 7 at 5085 ft. with the Monterey open below the shoe of the 8⅝ in. casing at 4725 ft. but no estimate of production was available at this writing.

Bel-Air Oil Co. is preparing to drill Twitchell No. 1 in sec. 35,10-34 in the southerly portion of the field where the R. R. Bush and Hancock Oil Co. interests are planning a six well development program for the next few months.

Union Oil Co. is still far the most extensive operator having McCoy-Cooney No. 3 and Stinson No. 3 in the process of completion while Adam No. 3 is drilling and derricks are up for Battles No. 3 and Nicolai No. 3.

Guardian Oil Co., formed by a group of men from Shafter is planning to drill soon on a portion of the Paderewski Subdivision.

C.C.M.O. Testing Deep Rincon Well

Somewhat disappointing were first results of the production test now being made in Chanslor-Canfield Midway Oil Co.'s deep test of the Rincon field, Hobson No. C-9. The hole was bottomed at 9337 ft. where a 6⅝ in. liner containing 1070 ft. of perforations was landed and spliced to the 8⅝ in. casing at 7539 ft. As much oil sand of varying qualities had been cored in this interval, hopes were high that large production would be obtained but several days swabbing lowered the fluid to 6800 ft. while recovering approximately 200 bbls. a day of practically clean oil. Some encouragement was felt, however, when the fluid rose to the surface and flowed 117 bbls. in 18 hours while attempts were being made to recover a lost swab.

Richfield Oil Corp. is deepening below 4600 ft. in Hobson U. S. No. 3 after finding the first zone barren at 4165 ft.

Texas Abandons 3rd Elwood Try

After finding only salt water with a little gas, The Texas Co. aband-

COASTAL COUNTIES WILDCATS

Area	Well	No.	Section	Depth	Status
	Santa Barbara County				
Elwood	The Texas Co., Bishop	A-3	13, 4-29	3239	Abandoned
Goleta	Del Mar Oil Co. Rowe	1	11, 4-28	675	Idle
	Trans-Pacific Oil & Drlg. Co., Hollister	2-A	3, 4-29	1573	Abandoning
	San Luis Obispo County				
Huasna	Tex Harvey Oil Corp., Gilmore Comm.	1	11, 32-14	4253	Pumps water, trace oil
	Tex Harvey Oil Corp., Gilmore Comm.	2	11, 32-14	2200	Idle
Paso Robles	Epco, Inc., Epco	1	27, 26-13	6157	Idle
	Ventura County				
Bardsdale	Cook, Osmere, King	1	33, 4-19	25	Idle
	Hopland Oil Co.	1	1, 3-19	2158	Drilling
	Fairfield, F. E., Fairfield-Filmore	1	12, 3-20	3478	Pumping
	Palma Oil Co.	1	8, 3-19	1356	Drilling
Ojai	Oil Prod. Maintenance, Inc. Byhara	1	12, 4-22	500	Drilling
Piru	Glen Ogles Oil Co., Janes	1	16, 5-18	2863	Testing
Santa Susana	Norell, Gordon, Dixie	1	15, 2-17		Grade
Sespe	Chob Oil Co., Phillips	1	24, 4-20	106	Idle
	Inter Counties Fuel Co.	1A	22, 4-19	921	Drilling
	McCaslin, W. E., Burson	1	19, 4-19	2000	Prep. to run csg.
	Signal Petroleum Co., Hadley	7	13, 4-19	3576	Testing
South Mountain	Comstock Pet. Co.	1	17, 3-29	1820	Drilling
	Purple Oil Co.	1	17, 3-20		Rigging up
	South Mountain Oil Co.	1	10, 3-20	2750	Rigging pump
Timber Canyon	Crude Oils, Inc., West	1	10, 4-20	600	Drilling

NORTHERN COUNTIES WILDCATS

County	Well	No.	Section	Depth	Status
Colusa	Pacific National Pet. Corp.	1	17, 17n-4w		Rig
Contra Costa	Lafayette Oil Co., Morris	1	28, 1n-2w	1450	Drilling
Glenn	Holly Sugar Co.	1	32, 22n-1w	2110	Drilling
Mendocino	Keyt, N. F.	1	3, 12n-17w	525	Drilling
Monterey	Loma Grande Oil Co., Corey	1	23, 24s-10e	3915	Fishing
	Priest Valley Pet. Co., Greve	1	22, 20s-12e	2885	Cementing
Sacramento	Amerada Pet. Corp., Calif. Lands, W & R Comm.	1	3, 3n,3e	3903	Drilling
	Jergins Oil Co., Twitchell	1	8, 3n-3e		Grading
	Standard Oil Co., Oulton	1	9, 3n-3e	3920	Completed
	Superior Oil Co., Larsen	1	8, 3n-3e		Location
	Superior Oil Co., McCormac	1	9, 3n-3e		Location
	Portable Drlg. Equip & Supply Co.	1	35, 8n-4e	310	Idle
San Joaquin	Standard Oil Co., Blewett	2	25, 3s-6e	5507	Completed
Stanislaus	Don Pedro Oil Co.	1	9, 6s-9e	1906	Idle
Yuba	Wright, L. G., Cox	1	18, 14n-5e	1795	Idle

oned Bishop No. A-3 at Elwood. Contractor E. A. Bender carried the hole to 3237 ft., bottoming in Vaqueros sand which is highly prolific in many Coastal fields. Two formation tests were made below 3130 ft., each showing a fair gas blow but proving the horizon definitely wet.

Shell Completes Big Ventura Wells

Shell Oil Co. recently brought in several good wells in the Ventura Avenue field, the largest of which was Taylor No. 131. Located in the westerly section, the well was finished in the interval 6440-7280 ft. with a potential of 2385 bbls. of 31 gravity oil and 1,971,000 cu. ft. of gas. On the same property, Shell completed No. 135 for 1761 bbls. and No. 136 for 582 bbls. Edison No. 34 was returned to production at 380 bbls clean, after repair work.

Tide Water Associated Oil Co.'s Lloyd No. 94 became one of the field's poorest producers when it was put on production for 55 bbls. cutting 10%, but the company's McGonigle No. 5 came in for 1320 bbls. from 8264 ft.

Bolsa Chica Oil Co. ran into trouble because of collapsed surface casing in its No. 7 and skidded the rig to drill No. 7-A. Alliance Petroleum Corp. and British-American Oil Producing Co. have wells drilling near 8000 ft. while General Petroleum Corp. is reconditioning Barnard No. 16 and preparing to drill No. 20.

Shell Oil Finishes Capitan Drilling

With five new wells on production at rates from 850 to 1150 bbls. a day, Shell Oil Co. completed its drilling spurt on the Covarrubias lease at Capitan in Santa Barbara county. Using a new portable drilling rig, Shell set something of a record in spudding the first of the group on the 16th of April and completing the last on the 21st of May for an average of one finished well per week over a five week period. Two strings of casing, 8⅝ in. surface pipe at 525 ft. and a combination water-oil string on bottom, were run for each project as well as rods and tubing. The 5½ in. water-oil string in each case was landed at approximately 1475 ft. and cemented through perforations at the top of the Vaqueros oil sand at about 1360 ft.

All the new wells were entirely free of water and the gravity averaged 22 degrees A.P.I. Each produces approximately 150,000 cu. ft. of gas. Drilling equipment has been transferred back to Mount Poso where a number of new wells will be drilled.

C.C.M.O. Coring Famoso Wildcat

Chanslor-Canfield Midway Oil Co.'s Famoso No. 12-1, sec. 12,27-26, is coring at 4909 ft. after finding the Olcese barren at 3840 ft.

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April 16, 1941

Mr. Walter C. Monroe, Editor
California Oil World
939 South Broadway Bldg.
Los Angeles, California

Dear Mr. Monroe:

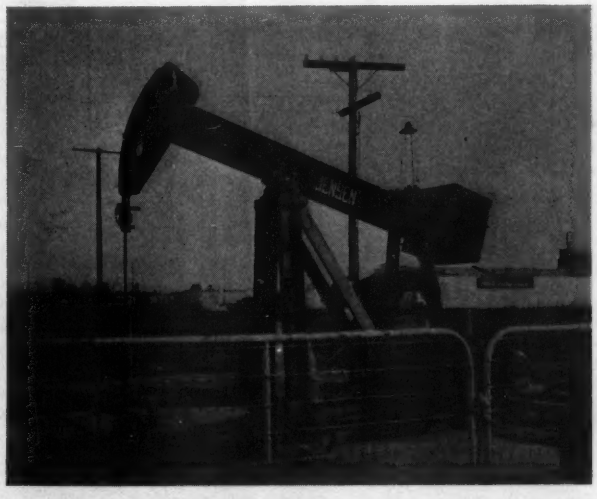
In your April, 1941, issue you published a portion of an article on page 10 which was delivered as a paper by Mr. H. M. Henderson of the Standard Oil Company. The subject of this article was the Magnetest method of testing steel, and there was included in the article a record of certain wells which have been tested by us.

Apparently there were some errors in this record as you published it, and we are taking the privilege of sending you a correct copy showing the accurate information. I believe you would wish to republish the exact record in a subsequent edition of your magazine in order to make the records correct.

Yours very truly,
Emmett M. Irwin, Chief Engineer.

MAGNETEST CORPORATION
TYPICAL RECORD OF WELLS TESTED

Well	Date Tested	Depth	Rods	S. P. M.	Length	Size Plunger	Prior Breaks Per Yr.	No. of Rods Removed	Subsequent Breaks	Months In Service to 3-18-41
A	9-10-40	7170′	37–1″ 54–⅞″ 147–¾″	18	108″	1¼″	48	54	1 break	6
B	7-30-40	6569′	93–⅞″ 124–¾″	Formerly 16 Now 23*	60″	1½″	Est. 24	118	No breaks. Net Production Doubled.	7½
C	9-24-40	4000′	37–⅞″ 95–¾″	22	66″	2¼″	16 breaks 32 unscrews	21	No breaks.	6
D	9-25-40	4547′	43–⅞″ 108–¾″	24	54″	1½″	40	38	1 break (Experimental) re-heat-treated rod)	6
E	9-26-40	4500′	79–⅞″ 70–¾″	24	54″	1¼″	25	11	No breaks.	6
F	9-25-40	5177′	48–⅞″ 124–¾″	24	48″	1½″	28	22	3 breaks (Rejected rods returned to well by mistake.)	6
G	8-20-40	4175′	50–⅞″ 77–¾″	24	40″	2″	84	75 Replaced with used tested rods.	No breaks.	7
H	5-27-40	6700′	223–⅝″	18	40″	1¼″	52	50–⅝″	1 break in new untested rod.	10



The installation shown at right is on the S. Bernstein Well No. 2, located in the Long Beach Harbor District. This well is 3560 ft. deep and is fitted with ¾″ sucker rods and a pump having a 2¼″ plunger in a 2½″ tubing. Pumping is at the rate of 22-45″ strokes per minute with the pump set at a depth of 3530 ft. The electric motor is Fairbanks-Morse Type 'QSZS', 15 h.p., 3-50-220, 900 RPM.

The net production of this well is 76 barrels of 14 deg. gravity oil per 24 hours. The pumping unit is a Model No. 14D Jensen, having a rated polished rod load capacity of 14,000 lbs.

The installation shown at left is of particular interest because it shows one of the first new Model Type 'ZC' Fairbanks-Morse engines installed in the California oil fields. It is operating on the lease of the Silver Star Oil Co. near Yorba Linda, Calif.

This well is 2200 feet deep and is fitted with ¾″ sucker rods, the pump having 2-inch plungers in 2½-inch tubing. The net output of the well is 130 barrels of 19 degrees gravity oil per 24 hours. Pumping is at the rate of 17—36″ strokes per minute with the pump set at 1700 ft. depth. The pumping unit is a Model 12-D Jensen, having a rated polished rod load capacity of 12,000 lbs.

The three Type 'ZC' engines on this lease have been in operation for approximately 10 months and the owner of the lease as well as the superintendent is very enthusiastic about the fine operation and low operating costs of these engines.

All of this equipment was sold through the Oil Tool Corp., 3075 Cherry Ave., Long Beach, who are distributors for Jensen Pumping Units, Fairbanks-Morse motors and 'Z' engines.

New Stack Blower Operates on Less Steam

A new High Velocity Steam Stack Blower was recently introduced to the Oil Field Industry. This Blower, according to the manufacturer, will furnish enough forced draft in the stacks of the boilers to operate at 200% capacity on as little as 2% of the steam generated by the boiler.

It is claimed this blower will give the maximum velocity to the flue gases, and will cause the least resistance in the stacks of the boilers. Streamlined in design, it is made of tough malleable iron, and is equipped with stainless steel nozzle jets. It is built to stand up under the roughest oil field conditions, and will give long satisfactory service. A new Bulletin on this Blower may be had by writing to, The Inferno Co. Dept., COWPI, Shreveport, Louisiana.

Stansbury & Stansbury Add New Mud Pump

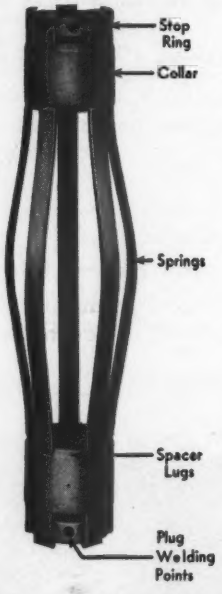
Shown above is the new Stansbury & Stansbury mud pump.

This mud pump is a Gardner-Denver 7¼" x 10" type FXO—FO driven by two Mercury engines.

It will be noticed that this pump is completely portable and the engines are powered with butane. The assembly was made by the Hopper Machine Works and was sold by the Petroleum Equipment Co. Stansbury and Stansbury whose address is P. O. Box 296, Avenal, California, operate an oilfield service. They have been located in Avenal for sometime and have built up a reputation in that district. They have well pulling equipment and special equipment for pulling casing out of the wells. The mud pump shown here will be for rental service in that district. "Curly" Stansbury is the manager.

Baker Oil Tools Casing Centralizer

A new design of casing centralizer to provide an effective means of centering casing in either cased or open hole has recently been developed by Baker Oil Tools, Inc., Box 127, Vernon Station, Los Angeles. Known as Baker Model "B" Casing Centralizer, this tool is so constructed that the springs are always pulled through a restricted area, thus



eliminating any pushing which tends to cause expansion at points where contraction is necessary. The centralizer is attached to the string of casing by merely slipping it on the pipe, positioning it at the desired point and plug-welding two stop rings to the casing.

As shown in the illustration, the centralizer consists of a number of springs, two collars and the two stop rings. The collars are placed near the ends of the springs to confine them at top and bottom and to maintain their circumferential position. The springs are not attached to the collars but are made with an offset where they pass through the collars and are held in proper position by means of spacer lugs projecting from the top and bottom of each collar, the ends of the lugs being turned down to hold the springs securely in place. Elongation of the springs is limited by the stop rings to give a specified compressed diameter to the centralizer when the collars contact the stop rings. The ends of each spring are forged hooks which fit over the outer edges of the stop rings and give a specified maximum diameter to the centralizer.

The only parts actually attached to the casing are the stop rings which are welded to the pipe by means of plug welds at four points. The springs and collars are free to turn as a unit; and when running casing equipped with this centralizer there are no strains set up when the casing is turned nor has the centralizer any tendency to revolve as it goes down the hole. The design also results in the centralizer always being pulled through other strings of casing by a stop ring and not being pushed through. This pulling action permits the centralizer to contract readily when going through a restriction instead of having to overcome a tendency to expand as would be the case if its action resulted from its being pushed against the restriction obstructing its passage.

Chain Belt Advances D. A. Kalton, A. W. Thomas

Chain Belt Co. of Milwaukee announces the appointment of D. A. Kalton and A. W. Thomas as assistants to the sales manager of the Construction Equipment Division of the company.

Mr. Kalton has been with Chain Belt Co. since graduation from Marquette University in 1932 and has served both in the home office sales department and as Eastern District Manager.

Mr. Thomas who is also a former district manager has been connected with the company since 1927. He has been connected with both the sales and engineering departments of the Construction Equipment Division and is a graduate of Purdue University in civil engineering.

The Construction Equipment Division of Chain Belt Co. manufactures Rex concrete mixers, Rex mortar and plaster mixers, Rex Moto-Mixers, Rex concrete road pavers, Rex centrifugal water pumps, and Rex Pumpcrete (the pump that pumps concrete).

Development in the use of chemical solutions for growing plants brings the prediction that trailer tourists will be able to grow their own food on the roofs of their rolling homes.

Here is the Stansbury & Stansbury 7¼ x 10 FXO-FO Gardner-Denver Pump powered with 2 Mercury Engines. The unit was assembled by Hopper Machine Works and sold by Petroleum Equipment Co.

E. L. Decker on Mid-Continent Trip

E. L. Decker, vice-president of Martin-Decker Corp., Long Beach, left that city May 11 for an extended trip to the Gulf Coast and Mid-Continent in the interests of his company. He attended the A.P.I. Midyear meeting at Tulsa, May 19, and at the Houston Oil Show he received the Certificate of Award for the Los Angeles Chapter of Nomads.

E. L. Decker

Modern equipment drills west Dominguez wells to completion in three weeks or so. H. G. (Pat) Henderson was caught by the camera while inspecting operations at the F. O. Whitelaw test well at Atwood.

Standard Statement On Gasoline Price Rise

Referring to gasoline price now one half cent lower than before reduction of May, 1940, referring to the proposed examination of the recently announced increase in the price of crude oil in California and the increase of one half cent per gallon in the price of gasoline, the Standard Oil Co. of California issued the following statement: "When the government authorities meet with the California oil industry they will find that the increases in the price offered to producers of crude oil and the selling price of gasoline are justified. The price of the company's regular grade of gasoline is now one half cent lower than the price in effect before the reduction of last May 27, 1940."

These men have just witnessed the setting of a speed record by their Franks portable well servicing rig at Huntington Beach. Left to right they are: Jack Kelley, of Hillman-Kelley; M. D. Hughes and J. W. Gifford, of Long Beach Oil Development Co., and J. M. Hillman, of Hillman-Kelley, California distributors for Franks Manufacturing Co.

Dale Russell Made Republic Supply Director

At a special meeting of the Board of Directors of Republic Supply Co. of California held on May 25, W. Dale Russell was elected a director.

W. D. Russell

Dale is a real "Old Timer" in the industry having begun his career with the old Tay-Pike Co., at its inception in 1913. Later joining Republic when it was formed. He was in charge of the first Republic Store at Coalinga and saw service in most of the "Boom" fields prior to his transfer to Los Angeles in 1926. He is at present doing special sales work at Republic, is chairman of the "Wildcats" of the Calif. Oil & Gas Assn. and active in many industry activities.

Incidentally, at the very moment Dale was elected a director of Republic, his son Bob was being married in Las Vegas, Nevada, so the 25th was a red letter day all around.

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Oil Men's Calendar

Calif. Natural Gasoline Association. Los Angeles Chapter—Meets 1st Thursday Each Month, Barker Bros. Bldg., Los Angeles—Dinner at 6:00 (Optional). Taft Chapter—Meets Third Thursday Each Month.

American Society of Mechanical Engineers—Los Angeles Section—Meets 2nd Thursday Each Month—Barker Bros. Bldg., Los Angeles. Dinner at 6:30 (Optional).

September

8-12—American Chemical Society, Chalfonte-Haddon Hall, Atlantic City, N. J.

17-19—National Petroleum Assn., 39th Annual Meeting, Hotel Traymore, Atlantic City.

25-26—Society of Automotive Engineers, National Tractor Meeting, Schroeder Hotel, Milwaukee, Wisc.

29-30—National Lubricating Grease Institute, Ninth Annual Meeting, Stevens Hotel, Chicago, Ill.

October

16-18—American Institute of Mining & Metallurgical Engineers, Petroleum Division, Dallas, Tex.

30-Nov. 1—Society of Automotive Engineers, National Aircraft Production Meeting, Biltmore Hotel, Los Angeles, Calif.

31—California Natural Gasoline Assn., Los Angeles, Calif.

(Continued from Page 16)

solvents, plasticizers, and waxes chemically possible from petroleum is fully as large as the number of plastics and synthetic rubbers themselves.

United States industry, in general, and the chemical industry, in particular, are aware of the potentialities and are spending literally millions of dollars in research in these fields. Both points are well covered in a recent report on industrial research by Dr. William A. Hamor.

1. "Over 200,000,000,000 pounds of synthetic rubber could theoretically be produced each year from ethylene, benzene, and butadiene".

2. "United States industries spent $220,000,000 on production research last year (up from $100,000,000 in 1937). While this represents less than one-half percent of their gross income, ten firms (four of them chemical companies) spent more than 10 per cent." (13)

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